

TECHNICAL MANUAL

UNIT, DIRECT SUPPORT, AND GENERAL SUPPORT
MAINTENANCE MANUAL

(INCLUDING REPAIR PARTS AND
SPECIAL TOOLS LIST)

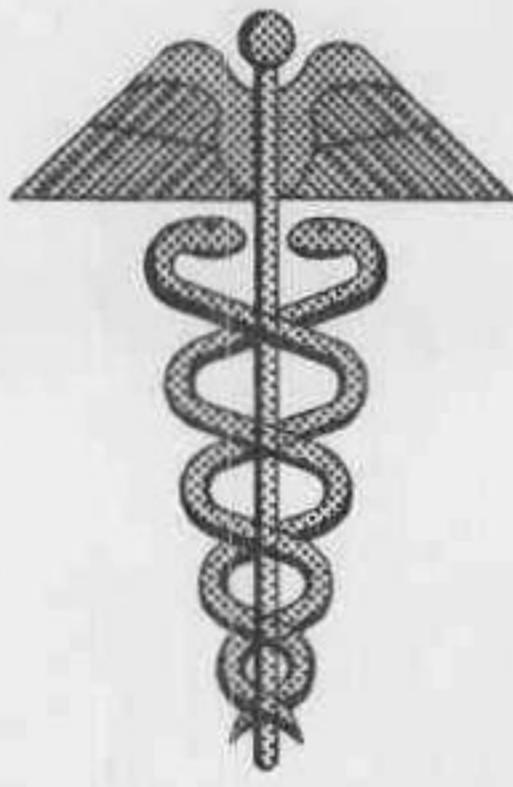
CABINET, SOLUTION WARMING
MODEL 5550

6530-01-269-1802

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HEADQUARTERS, DEPARTMENT OF THE ARMY

1992



SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL.

IF POSSIBLE, TURN OFF THE ELECTRICAL POWER.

**IF YOU CANNOT TURN OFF THE ELECTRICAL POWER,
PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A
DRY WOODEN POLE OR A DRY ROPE, OR SOME OTHER
INSULATING MATERIAL.**

SEND FOR HELP AS SOON AS POSSIBLE.

**AFTER THE INJURED PERSON IS FREE OF CONTACT
WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE
PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY
START ARTIFICIAL RESUSCITATION.**

Throughout this manual are **WARNINGS**, **CAUTIONS**, and **NOTES**. Please take time to read these. They are there to protect you and the equipment.

WARNING

Procedures which must be observed to avoid personal injury, and even loss of life.

CAUTION

Procedures which must be observed to avoid damage to equipment, destruction of equipment, or long-term health hazards.

NOTE

Essential information that should be remembered.

TECHNICAL MANUAL
NO. 8-6530-008-24&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC

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CABINET, SOLUTION WARMING
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You can help improve this manual. If you find any mistakes or if you know a way to improve procedures, please let us know. Mail your memorandum, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 (Recommended Changes to Equipment Technical Publications) located in the back of this manual, to: Commander, U.S. Army Medical Materiel Agency, ATTN: SGMMA-M, Frederick, MD 21702-5001. A reply will be furnished directly to you.

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TABLE OF CONTENTS

		<i>Page</i>
	HOW TO USE THIS MANUAL	iv
CHAPTER	1. INTRODUCTION	
Section	I. General Information	1-1
	II. Equipment Description and Data	1-3
	III. Principles of Operation	1-6
CHAPTER	2. OPERATING INSTRUCTIONS	
Section	I. Operating Procedures	2-1
	II. Warming Cabinet Operation	2-2
	III. Operation of Auxiliary Equipment	2-4
	IV. Cleaning Procedures	2-4
	V. Operation Under Unusual Conditions	2-6

CHAPTER	3. UNIT LEVEL MAINTENANCE	
Section	I. General Information	3-1
	II. Service Upon Receipt of Equipment	3-1
	III. Lubrication Instructions	3-2
	IV. Preventive Maintenance Checks and Services	3-2
	V. Functional Testing	3-3
	VI. Troubleshooting	3-5
	VII. Calibration Instructions	3-8
	VIII. Maintenance Instructions	3-10
	IX. Temperature Scales	3-25
	X. Storage and Shipment Procedures	3-26
CHAPTER	4. DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE	
Section	I. General Information	4-1
	II. Troubleshooting	4-1
	III. Voltage Conversion	4-1
APPENDIX	A. REFERENCES	A-1
	B. MAINTENANCE ALLOCATION CHART	B-1
	C. COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST	C-1
	D. EXPENDABLE AND DURABLE SUPPLIES AND MATERIALS LIST	D-1
	E. REPAIR PARTS AND SPECIAL TOOLS LIST	E-1
GLOSSARY	.....	GLOSSARY-1
INDEX	.....	INDEX-1

LIST OF ILLUSTRATIONS

Figure No.	Title	Page
1-1	Cabinet, solution warming	1-1
1-2	Warming cabinet components	1-3
1-3	Manufacturer data plate	1-5
1-4	Caution label	1-5
1-5	Warning label	1-5
1-6	Instruction label	1-5
1-7	Heated air flow	1-6
2-1	Control panel	2-1
2-2	Shelf adjustments	2-2
2-3	Shelf filter	2-5
3-1	Control housing PCB location	3-4
3-2	Control housing PCB	3-4
3-3	LED indicators	3-4
3-4	Volume control and switches	3-5
3-5	Electrical block diagram	3-8
3-6	Cabinet control chassis (power supply)	3-8
3-7	Voltage test points (+5 VDC)	3-9
3-8	Power supply voltage adjustment	3-9
3-9	Power supply (+2.5 VDC) adjustment	3-9

3-10	Door brackets	3-10
3-11	Door and shelf gaskets	3-10
3-12	Door hinges	3-11
3-13	Door components	3-11
3-14	Manufacturer nameplate	3-12
3-15	Door handle	3-12
3-16	Cabinet control chassis (transformer)	3-13
3-17	Transformer	3-13
3-18	Cabinet control chassis (low voltage power supply)	3-14
3-19	Low voltage power supply	3-15
3-20	Cabinet control chassis (fans)	3-16
3-21	Fans	3-16
3-22	Cabinet control chassis (heaters)	3-17
3-23	Heaters	3-18
3-24	Cabinet control chassis (thermostat)	3-19
3-25	Thermostat	3-20
3-26	Temperature sensor	3-21
3-27	Cabinet control chassis (relays)	3-22
3-28	Relays	3-23
3-29	Printed circuit board	3-24
3-30	EPROM	3-25
3-31	Temperature scale conversion	3-26
3-32	Terminal block	3-27
4-1	Electrical connections for 120-volt operation	4-2
4-2	Electrical connections for 240-volt operation	4-3
E-1	Warming cabinet exterior	E-2
E-2	Control housing	E-4
E-3	Door assembly	E-8
E-4	Warming cabinet (front)	E-12
E-5	Heater assembly	E-16
E-6	Fan and heater assemblies	E-18
E-7	Cabinet control chassis (front)	E-22
E-8	Control module door (open)	E-24
E-9	Control module (inside)	E-26

LIST OF TABLES

Table No.	Title	Page
1-1	Nomenclature cross-reference list	1-2
1-2	Dimensions	1-4
1-3	Miscellaneous characteristics	1-4
3-1	Preventive maintenance checks and services	3-3
3-2	General troubleshooting	3-5
3-3	Overheat condition troubleshooting	3-7

HOW TO USE THIS MANUAL

- This manual provides all the information needed to understand the capabilities, functions, and characteristics of this equipment. It describes how to set up, operate, test, and repair the equipment. You must familiarize yourself with the entire manual before operating or beginning a maintenance task.
- The manual is arranged by chapters, sections, and paragraphs followed by appendixes, a glossary, an index, and DA Forms 2028-2. Use the table of contents to help locate the chapter or section for the general subject area needed. The index will help locate more specific subjects.
- Multiple figures and tables are provided for your ease in using this manual. Words that are both capitalized and in quotation marks are names of components or words that you will actually see on the equipment.
- Chapter 3 provides a systematic method of inspecting and servicing the equipment. In this way, small defects can be detected early before they become a major problem causing the equipment to fail to complete its mission. Make a habit of doing the checks and services in the same order each time and anything wrong will be detected quickly.
- Specific direct support and general support maintenance instructions are included. Only perform maintenance functions specified in the maintenance allocation chart for your level of maintenance. Maintenance functions specified for higher levels of maintenance frequently require additional training; test, measurement, and diagnostic equipment; or tools.

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

1-1. Scope.

This manual describes the warming cabinet (fig 1-1); provides equipment technical data; and provides operational and maintenance functions, services, and actions. Additional information follows:

- a. *Type of manual.* Unit, direct support (DS), and general support (GS) maintenance (including repair parts and special tools list).
- b. *Model number and equipment name.* Model number 5550, Cabinet, Solution Warming.
- c. *Purpose of equipment.* To provide for heating and storing solutions, blankets, drapes, towels, and other dry goods.

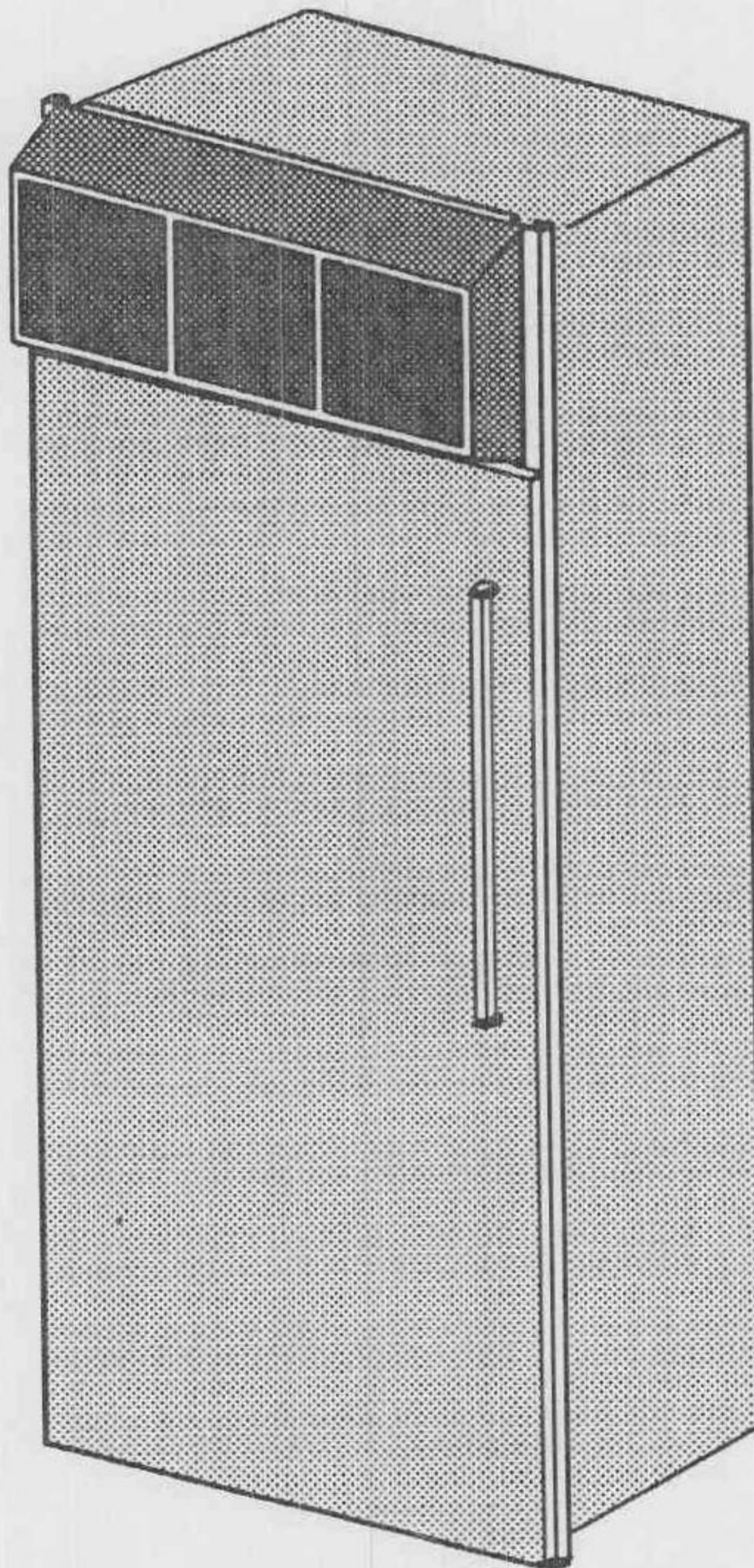


Figure 1-1. Cabinet, solution warming.

1-2. Explanation of abbreviations and terms.

Special or unique abbreviations, acronyms, and terms used within this manual are explained in the glossary.

1-3. Maintenance forms, records, and reports.

TB 38-750-2 prescribes forms, records, reports, and procedures.

1-4. Destruction of Army materiel to prevent enemy use.

AR 40-61 contains instructions for destruction and disposal of Army medical materiel. Also, the SB 8-75 series provides periodic information and/or instructions on the destruction of medical materiel.

1-5. Administrative storage.

a. Place the warming cabinet in administrative storage for only short periods of time when a shortage of maintenance effort exists. This equipment should be in mission readiness condition within 24 hours or within the time factors determined by the directing authority. During the storage period, keep appropriate maintenance records.

b. Perform preventive maintenance checks and services (PMCS) listed in table 3-1 before placing Army equipment in administrative storage. When equipment is removed from storage, perform PMCS to ensure its operational readiness.

c. Inside storage is preferred for equipment selected for administrative storage.

1-6. Preparation for storage or shipment.

Procedures to prepare the warming cabinet for storage or shipment are listed in chapter 3, section X.

1-7. Quality assurance or quality control (QA or QC).

TB 740-10/DLAM 4155.5/AFR 67-43 contains QA or QC requirements and procedures.

1-8. Nomenclature cross-reference list.

Table 1-1 identifies official versus commonly used nomenclatures.

Table 1-1. Nomenclature cross-reference list.

<i>Common name</i>	<i>Official nomenclature</i>
Control housing	Housing, control head
Control housing PCB	Board, counter PC
Control module	Control box
Control module door	Control box door
Control panel	Control panel, control head
Door, storage compartment	Door, control head
Fan	Blower
Spacer	Standoff
Warming cabinet/cabinet	Cabinet, solution warming

1-9. Reporting and processing medical materiel complaints and/or quality improvement reports.

AR 40-61 prescribes procedures for submitting medical materiel complaints and/or quality improvement reports for the warming cabinet.

1-10. Warranty information.

A warranty is not applicable.

Section II. EQUIPMENT DESCRIPTION AND DATA

1-11. Equipment characteristics, capabilities, and features.

- a. The warming cabinet is a self-contained unit that contains two fixed and two adjustable shelves, and circulates heated air uniformly over solutions and dry goods. Dimensions of the warming cabinet are listed in table 1-2.
- b. The unit operates from two voltages and frequencies as specified in table 1-3.
- c. The height of the three lower storage compartments may be adjusted by raising or lowering the two middle adjustable shelves.
- d. The capacities and allowable weights of solutions and dry goods are specified in table 1-3.

1-12. Description of significant components.

Components described in subparagraphs 1-12a through 1-12f are illustrated in figure 1-2.

- a. *Control panel.* The control panel includes all operator switches, an indicator, and temperature displays.
- b. *Cabinet door switch.* The switch provides an electrical interlock to turn off the heating circuit when the door is open.
- c. *Shelf filter.* The fixed position upper shelf incorporates a reusable filter to prevent dust and debris from entering the heated compartments and to direct the circulating air upward.
- d. *Adjustable shelves.* The two middle shelves are adjustable to provide for variation in heights of the three lower compartments. These shelves may also be removed.
- e. *Cabinet door.* The cabinet door may be converted to open from either the left or right side for ease of access depending upon the operating location of the cabinet.
- f. *Storage compartment.* The storage compartment, located in the control housing of the warming cabinet, is intended as a small storage area and provides access to the screw to release or lock the control housing.

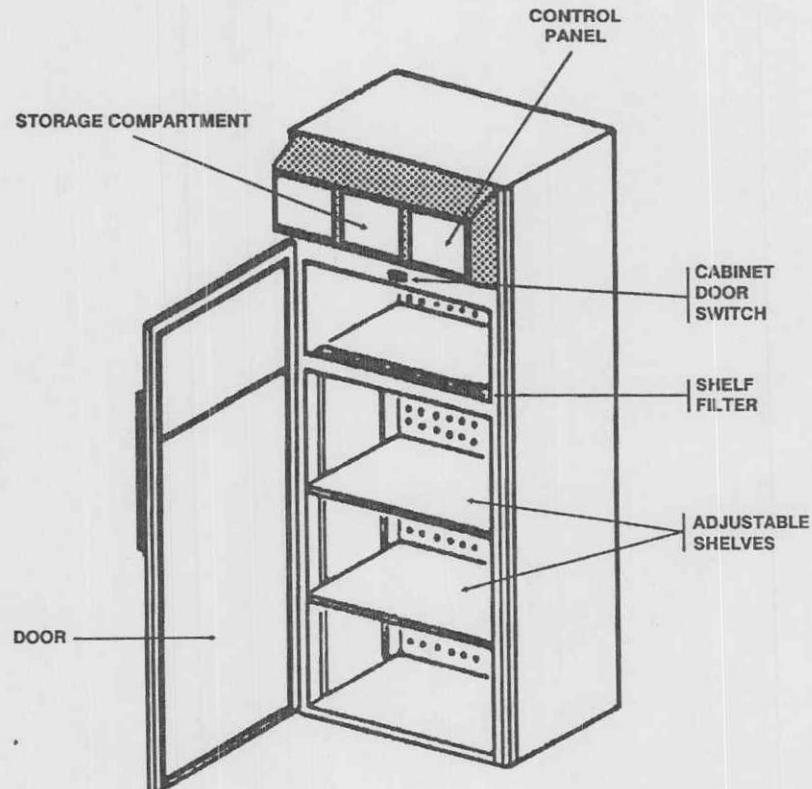


Figure 1-2. Warming cabinet components.

g. Circuit breaker. A circuit breaker is located above the control module door and serves as the primary electrical power switch and provides electrical fault protection for the warming cabinet.

1-13. Tabulated data and equipment decals.

a. Dimensions, miscellaneous characteristics, and temperature conversions. Tables 1-2 and 1-3 provide a broad range of physical dimensions and miscellaneous characteristics.

NOTE

A Celsius/Fahrenheit temperature conversion chart is located inside the back cover.

Table 1-2. Dimensions.

Warming cabinet	
Width .....	.30 in (76.2 cm)
Height .....	.74 in (187.9 cm)
Depth .....	.24 in (60.9 cm)
Upper compartment	
Width .....	.26 in (66.0 cm)
Height .....	.13 in (33.0 cm)
Depth .....	.21 in (53.3 cm)
Lower compartment	
Width .....	.26 in (66.0 cm)
Height .....	.40 in (101.6 cm)
Depth .....	.21 in (53.3 cm)

Table 1-3. Miscellaneous characteristics.

Electrical requirement .....	.120 V, 50/60 Hz, 10 A or 240 V, 50/60 Hz, 5 A
Temperature range .....	.97° F (36°C) to 160°F (71°C)
Storage capacity .....	.79.9 cu ft (1.19 m ³)
Each shelf .....	.20 two-liter square flasks
Storage weight .....	.100 lbs (45 kg) per shelf
Voltage tolerances	
+2.5 VDC .....	.±0.005 VDC
+5 VDC .....	.±0.01 VDC
Weight .....	.285 lbs (129 kg)

b. Identification, instruction, and warning plates, decals, or markings.

(1) Two manufacturer data plates, located on the control module door and on the electrical power junction box cover, are identical and depicted in figure 1-3. The data plate voltage (115) is a nominal value and 120-volt is the value used elsewhere in the manual.

(2) A caution label providing electrical safety instructions, located on the control module door, is depicted in figure 1-4.

(3) A warning label, located inside the storage compartment, alerting personnel to the hazard of electrical shock, is depicted in figure 1-5. This label also includes German, French, and Spanish language versions.

(4) A label providing instructions to protect the warming cabinet, located on the inside of the control module door, is depicted in figure 1-6.

(5) A model number decal is located on the upper edge of the cabinet control chassis.

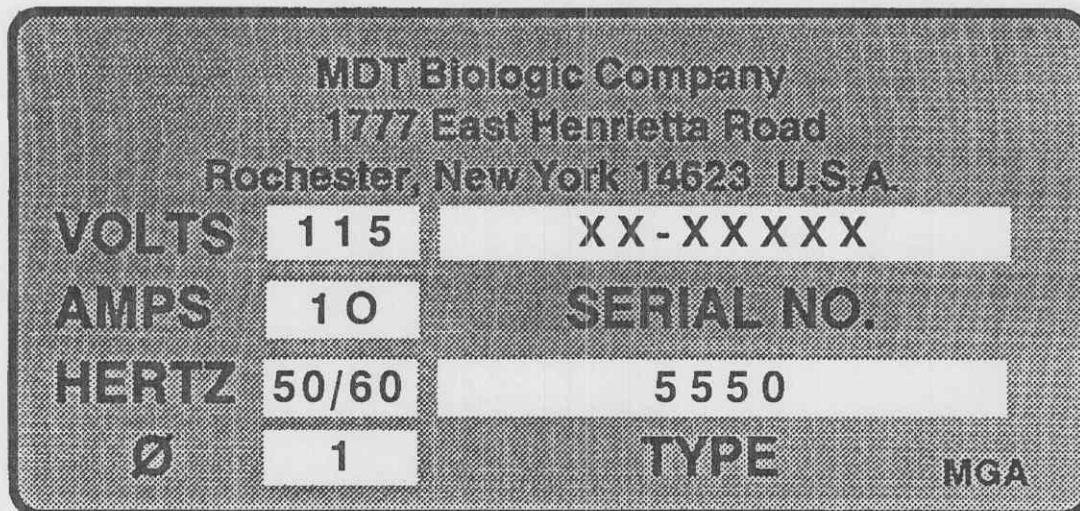


Figure 1-3. Manufacturer data plate.

CAUTION-DISCONNECT ALL SUPPLY CIRCUITS BEFORE WORKING ON THIS EQUIPMENT.

Figure 1-4. Caution label.

CAUTION--ELECTRIC SHOCK HAZARD. DO NOT REMOVE COVER. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

Figure 1-5. Warning label.

WARNING-FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH SAME TYPE AND RATING OF FUSE.

Figure 1-6. Instruction label.

1-14. Model differences.

Model differences are not applicable since this manual covers a single model. However, design changes in assemblies, subassemblies, or components occur periodically. Information on such engineering changes will be published in supply bulletins and subsequent changes to this manual.

1-15. Safety, care, and handling.

- a. Observe each WARNING, CAUTION, and NOTE in this manual. Electrical power and heated solutions, dry goods, or heated interior surfaces may be hazardous to personnel.

WARNING

Do not place flammable substances in the cabinet. This equipment contains electrical components designed to heat and circulate air within the cabinet. Contact with a flammable vapor may cause an explosion or fire. This could result in serious personal injury or damage to equipment and surrounding areas.

b. Ensure that a 2-inch (50 mm) clearance is maintained between the stored materials and shelves to permit circulation of heated air.

Section III. PRINCIPLES OF OPERATION

1-16. Basic operation.

The warming cabinet uses several basic physical principles for operation to include the circulation of heated air through the cabinet using electromechanical fans and convection currents. Electrical energy is also converted to heat for warming the air. The flow of heated air is illustrated in figure 1-7.

1-17. Controls and temperature displays.

The warming cabinet is controlled by electrical switches, a temperature control printed circuit board (PCB), a temperature sensor, a thermostat, and other ancillary circuitry and components. Two temperature displays and a light emitting diode (LED) provide information on the cabinet operation.

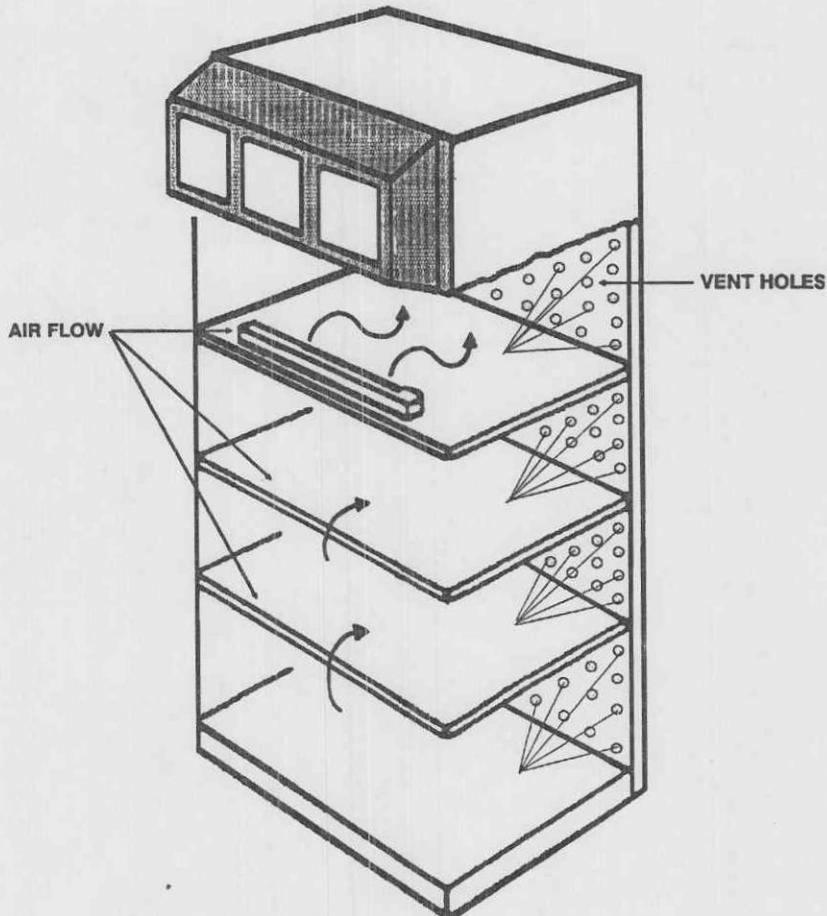


Figure 1-7. Heated air flow.

CHAPTER 2

OPERATING INSTRUCTIONS

Section I. OPERATING PROCEDURES

2-1. Switches, displays, and power indicator (fig 2-1).

- a. *Power "ON" switch.* This touch panel switch turns on the warming cabinet and activates the control panel.
- b. *Power on indicator.* The LED indicator illuminates when the power "ON" switch is depressed.
- c. *Power "OFF" switch.* This touch panel switch turns off the warming cabinet.
- d. *Actual temperature display.* The left-hand temperature display continuously indicates the actual temperature inside the warming cabinet while the control panel is activated.
- e. *"SET TEMPERATURE" display.* The right-hand temperature display continuously indicates the temperature you selected for the warming cabinet to maintain.

CAUTION

The letters "OH" will appear in the "SET TEMPERATURE" display if the actual temperature inside the warming cabinet increases above the "SET TEMPERATURE" by more than 7°F (4°C) to alert you to an overheat ("OH") condition.

- f. *Arrow switches.* These touch panel switches allow you to increase (▲) or decrease (▼) the warming cabinet temperature in one degree increments.

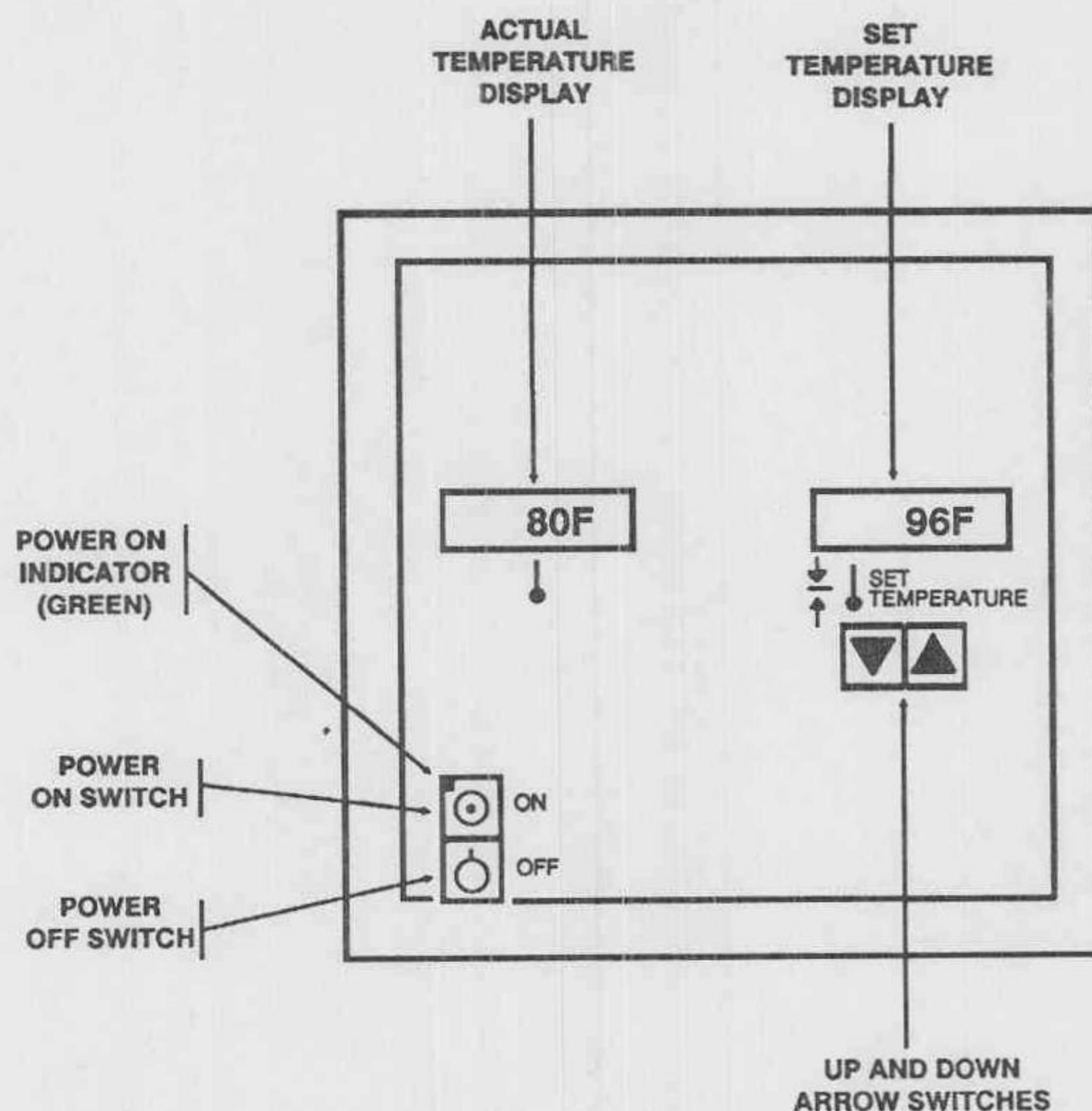


Figure 2-1. Control panel.

Section II. WARMING CABINET OPERATION

2-2. Initial start-up procedures.

The initial start-up procedures are as follows:

- a. Ensure that the warming cabinet is connected to a source of electrical power.
- b. Remove any items stored in the warming cabinet.
- c. Ensure that the adjustable shelves are correctly located or adjust their height by referring to figure 2-2 and complete the following actions.

NOTE

The height of the three lower compartments may be adjusted.

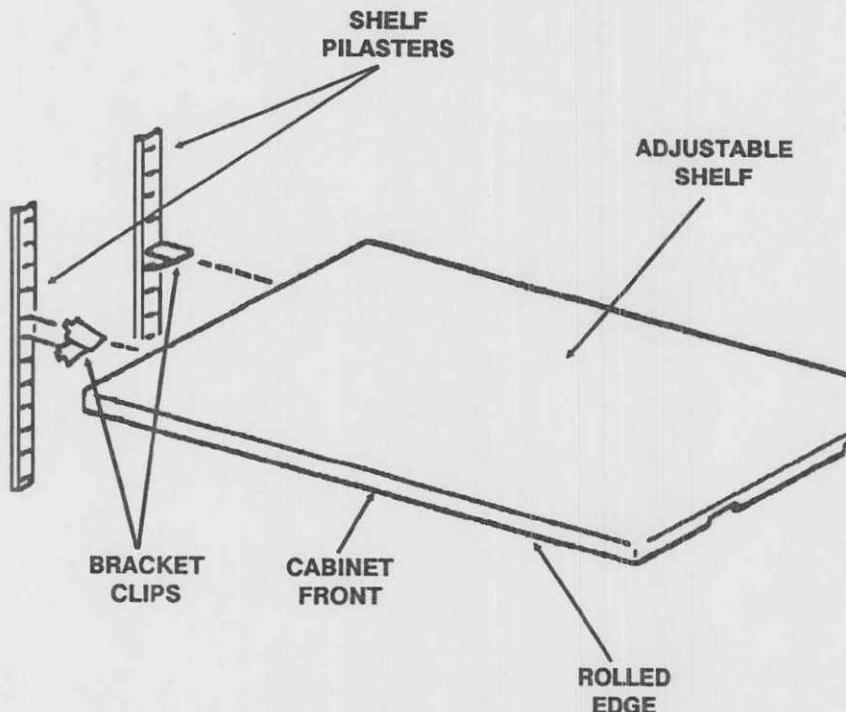


Figure 2-2. Shelf adjustments.

- (1) Open the warming cabinet door and swing it wide.
- (2) Lift a shelf upward off the four bracket clips and remove it from the warming cabinet. Set it aside.
- (3) Squeeze the flanges of a bracket clip while tilting the clip upward to remove it from the shelf pilaster. Remove the remaining three clips as you removed the first one.
- (4) Determine the new height for the shelf.
- (5) Replace a bracket clip by inserting the upper flange lip into the slot in the shelf pilaster and squeezing the flanges while tilting the bracket clip downward. Replace the remaining three clips as you replaced the first one.
- (6) Replace the shelf.

NOTE

Ensure that the rolled edge of each shelf is toward the front of the warming cabinet.

- d. Depress the power "ON" switch.
- e. Observe the control panel for the following indicators:
 - (1) The green indicator in the upper left corner of the power "ON" switch is illuminated.
 - (2) The actual temperature display is indicating the temperature inside the warming cabinet.

NOTE

The warming cabinet will now begin to heat if the cabinet door is closed. If you open the door while the cabinet is operating, the heating system will shut off and remain off until you close the door.

- f. Set the cabinet temperature by—

- (1) repeatedly depressing the "SET TEMPERATURE" up (\blacktriangle) or down (\blacktriangledown) arrow touch panel switches until the desired temperature appears in the display, or
- (2) depressing and holding the "SET TEMPERATURE" up (\blacktriangle) or down (\blacktriangledown) arrow touch panel switches until the desired temperature appears in the display.

NOTE

The displayed temperature will increase or decrease slowly at first, but after three seconds it will change rapidly when the "SET TEMPERATURE" arrow touch panel switches are depressed. Small temperature changes should be set by the first procedure.

- g. Periodically observe the temperature displays for normal operation.

WARNING

Touching the interior surfaces of the warming cabinet when it reaches temperatures above 120°F (49°C) may burn your skin.

2-3. Loading the warming cabinet.

Loading methods are based upon workload requirements and the following guidance.

- a. Always place solutions on the upper shelves, regardless of whether they are the only items placed in the cabinet or whether solutions and dry goods are placed in the cabinet. Dry goods may be placed on the same shelf with solutions.
- b. Ensure that the combined weight of shelf loads does not exceed the 100-pound maximum allowable weight.
- c. Ensure that items placed in the cabinet are allowed to heat properly. Dry goods require a minimum of 6 hours to heat properly; solutions require a minimum of 8 hours.

2-4. Shut-down procedures.

Depress the power "OFF" switch to shut down the warming cabinet.

WARNING

When the warming cabinet is shut down, the temperature of heated solutions and dry goods will not decrease as rapidly as the cabinet's interior. Very hot solutions, may react violently when brought into sudden contact with lower temperature outside the cabinet. Wear approved safety glasses when removing glassware from the cabinet to protect your eyes from possible shattering glass.

2-5. Special operating instructions.

To prevent overheating the warming cabinet, follow one of the two procedures below to decrease the selected temperature more than 7°F (4°C).

a. Procedure 1.

(1) Observe the actual warming cabinet temperature.

(2) Momentarily depress the "SET TEMPERATURE" down (▼) arrow touch panel switch four times to lower the set temperature four degrees below the actual cabinet temperature.

(3) Wait for the actual cabinet temperature to decrease to the set temperature.

(4) Repeat the procedure until the warming cabinet reaches the desired temperature.

b. Procedure 2.

(1) Observe the actual warming cabinet temperature.

(2) Open the cabinet door.

(3) Wait until the actual cabinet temperature matches your new desired temperature.

(4) Close the cabinet door.

(5) Depress and hold the "SET TEMPERATURE" down (▼) arrow touch panel switch until your new set temperature is reached.

2-6. Malfunctions.

A malfunction of the warming cabinet will be indicated when the letters "OH" appear in either temperature display (fig 2-1). An alarm buzzer will operate simultaneously. You should immediately depress the power "OFF" switch and notify your unit medical equipment repairer.

CAUTION

Always press the power "OFF" switch when a malfunction occurs to prevent the warming cabinet from overheating again. Should you fail to press the power "OFF" switch, the circuit breaker will totally shut off the cabinet.

NOTE

If the warming cabinet overheats and it is necessary to relocate the heated materials, allow a minimum of two hours for the internal temperature of the material to drop to a level which would enable you to remove the material.

Section III. OPERATION OF AUXILIARY EQUIPMENT

2-7. Associated support items of equipment.

No associated support items of equipment are supplied with or dedicated solely for support of the warming cabinet.

2-8. Associated material.

No associated material is supplied with or dedicated solely for support of the warming cabinet.

Section IV. CLEANING PROCEDURES

2-9. General.

a. Wipe the warming cabinet exterior surfaces weekly with a soft, dry cloth.

b. Wash the warming cabinet interior surfaces monthly with a mild cleaning agent.

WARNING

Touching the interior surfaces of the warming cabinet when it reaches temperatures above 120°F (49°C) may burn your skin.

- c. Wash the exterior surfaces, except for the control panel, semiannually using a mild cleaning agent.
- d. Wipe the control panel weekly with a soft, dry cloth.

2-10. Door gasket.

Clean the door gasket monthly using a mild cleaning agent.

NOTE

Inspect the door gasket for loose fastening screws or damage that would prevent the door from sealing properly.

2-11. Shelf filter (fig 2-3).

Clean the shelf filter monthly by completing the following actions:

- a. Depress the power "OFF" switch.
- b. Open the warming cabinet door.
- c. Remove the two thumbscrews that fasten the filter cover.

WARNING

The filter cover may be hot. Avoid skin burns by allowing the warming cabinet to adequately cool.

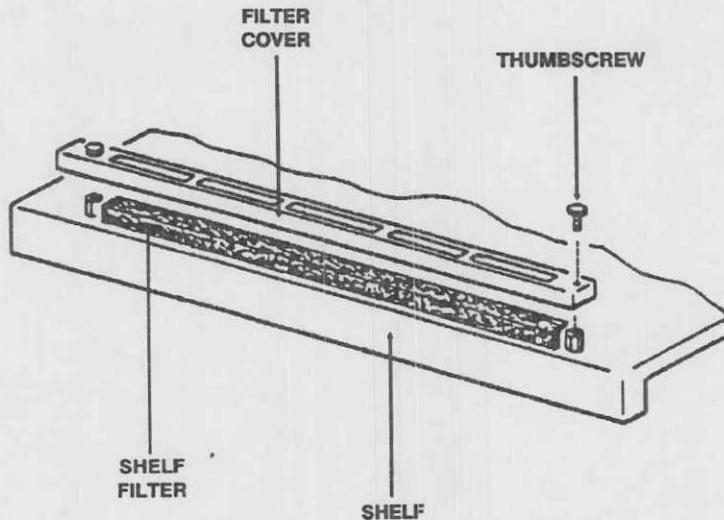


Figure 2-3. Shelf filter.

- d. Remove the filter cover and the filter.

NOTE

Ensure that the warming cabinet remains off while the shelf filter is removed to prevent the circulation of unfiltered air through the compartments.

e. Wash the filter in lukewarm water using a mild detergent. Shake it dry.

CAUTION

A clogged shelf filter will prevent the proper circulation and heating of air inside the warming cabinet.

f. Reinstall the cleaned filter or install a new filter.

g. Replace the two thumbscrews.

h. Close the warming cabinet door.

i. Resume normal operations.

Section V. OPERATION UNDER UNUSUAL CONDITIONS

2-12. General.

Operating the warming cabinet outside of its International Standards Organization (ISO) shelter environment may require a voltage conversion.

WARNING

Do not place flammable substances in the cabinet. This equipment contains electrical components designed to heat and circulate air within the cabinet. Contact with a flammable vapor may cause an explosion or fire. This could result in serious personal injury or damage to equipment and surrounding areas.

CHAPTER 3

UNIT LEVEL MAINTENANCE

Section I. GENERAL INFORMATION

3-1. Overview.

Maintenance functions, both preventive and corrective, that are beyond the scope of the user are assigned to unit level medical equipment repairer personnel. These personnel will perform the majority of maintenance required for the equipment except for some tasks involving the PCBs, voltage conversion, or cabinet frame. This chapter provides instructions and information to aid in performing the required tasks.

3-2. Tools and test equipment.

Common tools and test equipment required for unit level maintenance of the equipment are listed in appendix B, section III of this manual. Refer to your unit's modified table of organization and equipment (MTOE) for authorized items.

3-3. Components of end item and basic issue items.

Components of end item and basic issue items are listed in appendix C, sections II and III of this manual.

3-4. Expendable supplies.

Expendable and durable supplies and materials required for maintenance of the equipment are listed in appendix D, section II of this manual.

3-5. Repair parts.

Repair parts required for unit level maintenance are listed in appendix E, section II of this manual.

3-6. Special tools.

Special tools required for unit level maintenance of the equipment are listed in appendix E, section III of this manual.

Section II. SERVICE UPON RECEIPT OF EQUIPMENT

3-7. Unpacking, installing, and assembling the warming cabinet.

a. The warming cabinet is initially unpacked, installed, and assembled into an ISO shelter by depot personnel prior to issue to medical units. These actions include—

- (1) installing the bottom cover panel,
- (2) placing, leveling, and anchoring the warming cabinet in the ISO shelter,
- (3) adjusting the panel mounting studs,
- (4) installing the two side panels,
- (5) connecting the warming cabinet to electrical power, and
- (6) installing the top panel.

b. Unit level actions include—

- (1) removing the shelves from the bottom of the cabinet and installing them on their bracket clips, and
- (2) depressing the power "ON" switch momentarily to ensure that the cabinet is operational.

Section III. LUBRICATION INSTRUCTIONS

3-8. General.

No lubrication of the warming cabinet is required.

Section IV. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

NOTE

The PMCS table in this section contains all necessary unit level services for the warming cabinet.

3-9. General.

a. The warming cabinet must be inspected and serviced systematically to ensure that it is ready for operation at all times. Inspection will allow defects to be discovered and corrected before they result in serious damage or failure. Table 3-1 contains a list of PMCS items to be performed by unit level maintenance personnel.

b. Preventive maintenance is not limited to performing the checks and services listed in the PMCS table. There are things you should do any time you see they need to be done, such as checking for general cleanliness, observing for improper operational indicators, and maintaining the proper quantities of operating supplies.

c. The following is a list of the PMCS table column headings with a description of the information found in each column:

(1) Item No. This column shows the sequence in which to do the PMCS, and is used to identify the equipment area on the Equipment Inspection and Maintenance Worksheet, DA Form 2404.

(2) Interval. This column shows when each PMCS item is to be serviced: B - Before Operation, D - During Operation, A - After Operation, and S - Semiannually. B, D, and A should be performed with daily use of the equipment.

NOTE

When the equipment must be kept in continuous operation, check and service only those items that will not disrupt operation. Perform the complete daily checks and services when the equipment can be shut down.

(3) Item to be Inspected and Procedure. This column identifies the general area or specific part to be checked or serviced.

(4) Equipment is not Ready/Available If. This column lists conditions that make the equipment unavailable or unusable.

Table 3-1. Preventive maintenance checks and services.

ITEM NO	INTERVAL				ITEM TO BE INSPECTED AND PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	S		
1.	X	X	X	X	Warming cabinet. Inspect for damage to the panels, door, controls, indicators, cabinet control chassis, or interior components.	The equipment cannot be operated.
2.	X			X	Control module. a. Verify its performance by following the procedures in paragraph 2-2 and paragraph 3-11. b. Inspect for an accumulation of dirt or dust on electrical/electronic components.	The equipment overheats or does not control the temperature.
3.	X	X	X	X	Electrical power cable. Inspect for damage or wear.	The dust contributes to incorrect operation of the equipment.
4.	X	X	X	X	Shelf filter. Ensure that the shelf filter is not clogged.	The cable is damaged or frayed causing an electrical hazard. A clogged filter prevents improper air circulation or uncontrolled warming of materials.
5.				X	Fans and vents. Inspect the air circulating fans and vents for an excessive accumulation of dust.	The collection of dust results in a fire.

3-10. Reporting deficiencies.

If operator personnel discover problems with the equipment during PMCS that they are unable to correct, they must report them. Refer to TB 38-750-2 and report the deficiency using the proper forms. Consult with your unit level medical equipment repairer if you need assistance.

Section V. FUNCTIONAL TESTING

3-11. General.

a. This section contains information for testing the warming cabinet. Perform these tests after completing the initial start-up procedures and semiannually thereafter.

NOTE

The warming cabinet calibrations should be verified semiannually after completing the functional testing.

b. Perform the functional testing using the following procedures.

- (1) Depress the power "ON" switch.
- (2) Select a "SET TEMPERATURE" that requires the cabinet to heat.

ITEM NO	INTERVAL					ITEM TO BE INSPECTED AND PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	Q	S		
1	X	X	X		X	Warming cabinet. Inspect for damage to the panels, door, controls, indicators, cabinet control chassis, or interior components.	The equipment cannot be operated.
2	X				X	Control module. a. Verify its performance by following the initial start-up procedures and the general functional testing. b. Inspect for an accumulation of dirt or dust.	The equipment overheats or does not control the temperature. The dust contributes to incorrect operation of the equipment.
3	X		X		X	Electrical power cable. Inspect for damage or wear.	The cable is damaged or frayed causing an electrical hazard.
4	X		X		X	Shelf filter. Ensure that the shelf filter is not clogged.	A clogged filter prevents improper air circulation or uncontrolled warming of materials.
5	X	X	X		X	Door. Verify that the door seals properly.	An improper door seal prevents proper operation of the unit.
6					X	Fans and vents. Inspect the air circulating fans and vents for an excessive accumulation of dust.	Unit overheats or does not function properly.

ITEM NO	INTERVAL					ITEM TO BE INSPECTED AND PROCEDURE	EQUIPMENT IS NOT READY/AVAILABLE IF:
	B	D	A	Q	S		
1						X Warming cabinet. Inspect for damage to the panels, door, controls, indicators, cabinet control chassis, or interior components.	The equipment cannot be operated.
2						X Control module. a. Verify its performance by following the initial start-up procedures and the general functional testing. b. Inspect for an accumulation of dirt or dust.	The equipment overheats or does not control the temperature.
3						X Electrical power cable. a. Inspect for damage or wear. b. Ensure that electrical safety tests have been performed as scheduled.	The dust contributes to incorrect operation of the equipment. The cable is damaged or frayed causing an electrical hazard. An electrical safety hazard exists.
4						X Shelf filter. Ensure that the shelf filter is not clogged.	A clogged filter prevents improper air circulation or uncontrolled warming of materials.
5						X Door. a. Inspect the door gasket for damage, wear, or deterioration. b. Inspect door hinges for loose or missing hardware.	An improper door seal prevents proper operation of the unit. An improper door seal prevents operation of the unit.
6						X Fans and vents. Inspect the air circulating fans and vents for an excessive accumulation of dust.	Unit overheats or does not function properly.

(3) Access the control housing PCB by completing the following actions:

- (a) Open the storage compartment door.
- (b) Twist the screw located in the lower right corner to release the control housing.
- (c) Close the storage compartment door.
- (d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

NOTE

The control housing PCB is located on the underside of the control housing behind the control panel. (See fig 3-1 and fig 3-2.)

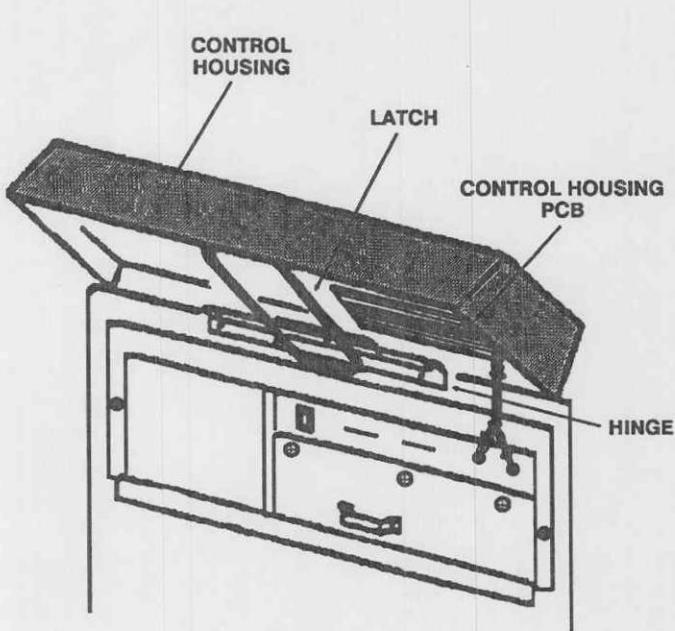


Figure 3-1. Control housing PCB location.

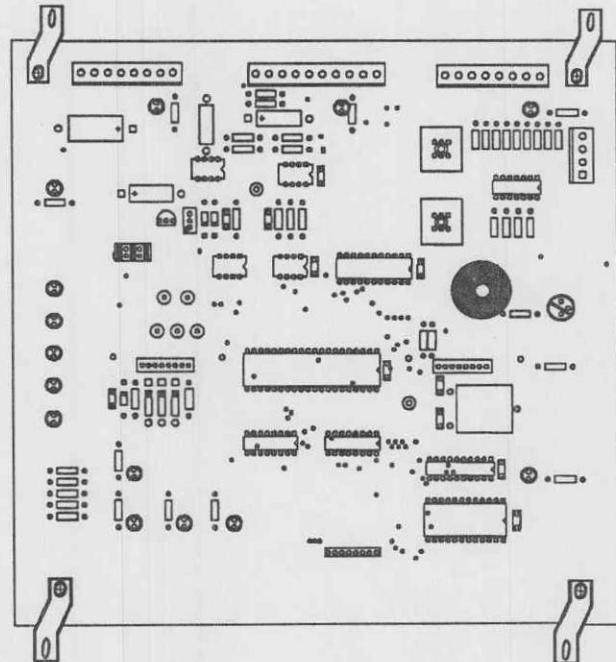


Figure 3-2. Control housing PCB.

(4) Check that the following LEDs on the PCB (fig 3-2) are illuminated:

- (a) "DS10" - "HEATER"
- (b) "DS11" - "BLOWER/SONIC GEN" (fan)
- (c) "DS14" - "POWER"

NOTE

LEDs identified as DS5, DS12, and DS13 are not used for warming cabinet operation.

(5) Open the warming cabinet door and observe that "DS10" and "DS11" LEDs are now off.

- (6) Close the door.

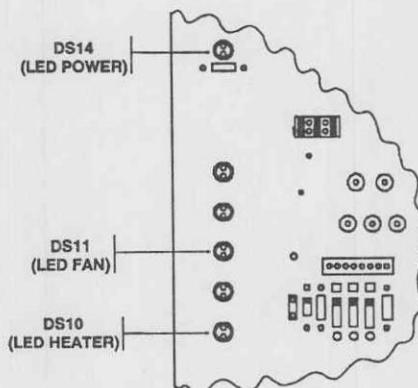


Figure 3-3. LED indicators.

(7) Depress the power "ON" switch on the control panel and note the volume of the alarm. If you want to adjust the volume of the alarm (buzzer), rotate the "VOLUME" control resistor "R28" (fig 3-4).

(8) Verify the correct positions of toggle switches "S1" and "S2." "S1" should be set to the "NORM" (normal) position and switch "S2" should be set to the "AERATOR/WARM" position (fig 3-4).

(9) Close the control housing by completing the following actions:

(a) Lift the control housing slightly upward to release the latch and then lower it.

(b) Open the storage compartment door.

(c) Twist the screw located in the lower right corner to lock the control housing.

(d) Close the storage compartment door.

(10) Depress the power "OFF" switch.

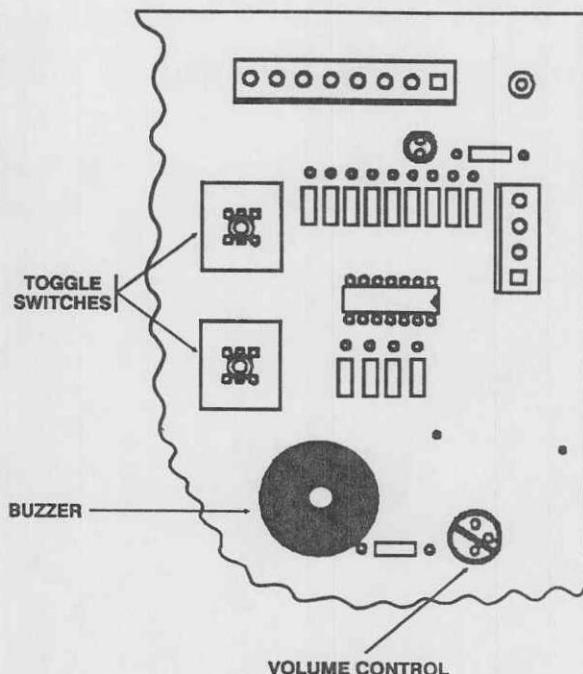


Figure 3-4. Volume control and switches.

Section VI. TROUBLESHOOTING

3-12. General.

a. General troubleshooting information for locating and correcting many of the operating malfunctions which may develop in the warming cabinet is located in table 3-2. Symptoms are provided for common malfunctions. Each symptom is followed by possible causes and corrective actions.

b. This manual cannot list all possible malfunctions. If a malfunction is not listed or is not determined by routine diagnostic procedures, notify your appropriate maintenance support unit.

Table 3-2. General troubleshooting.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. WARMING CABINET CANNOT BE TURNED ON.		
	Power "ON" switch defective.	
	Replace switch.	
	Circuit breaker problems.	
	Refer to symptom numbers 2 and 3.	
	Control housing PCB defective.	
	Perform the functional testing (para 3-11), verify calibrations (para 3-15), and repair as required.	

Table 3-2. General troubleshooting - continued.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
	Power supply defective.	Determine defective wiring or component, verify calibrations, and repair as required.
2. CIRCUIT BREAKER TRIPS WHEN WARMING CABINET IS COLD.		
	Defective circuit breaker.	Replace circuit breaker.
	Short circuit in cabinet.	Determine defective wiring or component(s) and replace as required.
3. CIRCUIT BREAKER TRIPS DURING WARM-UP OPERATION.		
	Incorrect temperature selection.	Adjust the "SET TEMPERATURE." (Refer to para 2-2f.)
	Defective fan(s).	Replace fan(s).
	Defective thermostat.	Replace thermostat.
	Defective PCB.	Repair or replace PCB.
4. WARMING CABINET WILL NOT HEAT.		
	Door open or ajar.	Close the door.
	Door switch defective.	Replace door switch.
	Defective PCB.	Repair or replace PCB.
	Defective electrical wiring.	Locate defective wiring or terminals and repair or replace as necessary.
	Clogged shelf filter.	Clean or replace filter.
	Defective heater(s).	Replace heater(s).
5. WARMING CABINET NOT REGULATING TEMPERATURE.		
	Power supply not within voltage tolerances.	Verify calibrations (para 3-15) and adjust or repair as required.

Table 3-2. General troubleshooting - continued.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
	Defective temperature control.	
	Replace temperature control.	
	Defective temperature sensor.	
	Replace sensor and calibrate the temperature control.	

3-13. Overheat troubleshooting.

Specific troubleshooting procedures to correct malfunctions revealed by the letters "OH" that appear in either temperature display are listed in table 3-3.

Table 3-3. Overheat condition troubleshooting.

SYMPTOM	POSSIBLE CAUSE	CORRECTIVE ACTION
1. LETTERS "OH" DISPLAYED IN ACTUAL TEMPERATURE DISPLAY.		
	"SET TEMPERATURE" lowered more than 7°F (4°C) below the actual cabinet temperature.	
	Readjust the "SET TEMPERATURE."	
	Defective power supply.	
	Verify the power supply calibration and adjust or repair as required.	
	Defective temperature control.	
	Verify calibration and adjust or repair as required.	
	Defective PCB.	
	Replace the PCB.	
2. LETTERS "OH" DISPLAYED IN "SET TEMPERATURE" DISPLAY.		
	Defective circuitry.	
	Determine circuitry problem and repair as required.	
	Defective PCB.	
	Replace PCB.	

3-14. Electrical diagram information.

- An electrical block diagram is provided (fig 3-5) to assist you in using the preceding troubleshooting tables. The diagram will also be useful with the subsequent calibration procedures and maintenance instructions.
- Additional information about the electrical wiring and components follows:
 - Alphanumeric codes identifying electrical wires are stamped on the protective insulation of the wires.
 - Red markings on white wires denote 120-volt usage.
 - Black markings on white wires denote a neutral 0-volt usage.
 - Violet markings on white wires denote low voltage usage.

(5) Jumper strips on terminal block "2TB" and jack "J4" are furnished with the warming cabinet.

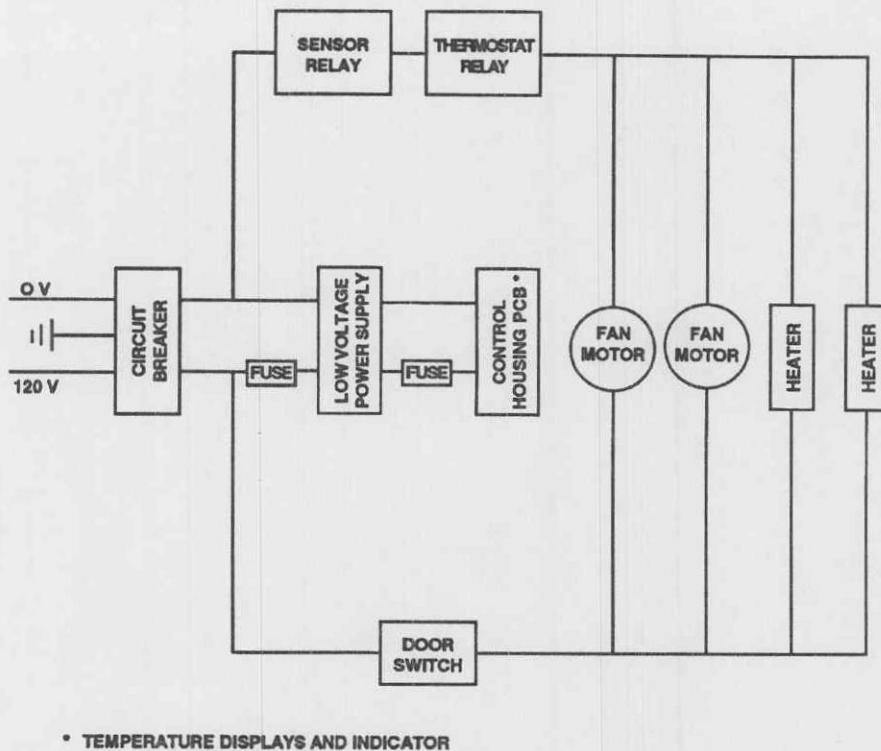


Figure 3-5. Electrical block diagram.

Section VII. CALIBRATION INSTRUCTIONS

3-15. Power supply voltage calibrations (fig 3-6 through fig 3-9).

a. Operate the warming cabinet by following the start-up procedures in paragraph 2-2. Allow the temperature to stabilize.

b. Access the cabinet control chassis by completing the following actions:

- (1) Open the storage compartment door.
- (2) Twist the screw located in the lower right corner to release the control housing.
- (3) Close the storage compartment door.
- (4) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

NOTE

The cabinet control chassis is located behind the control housing.

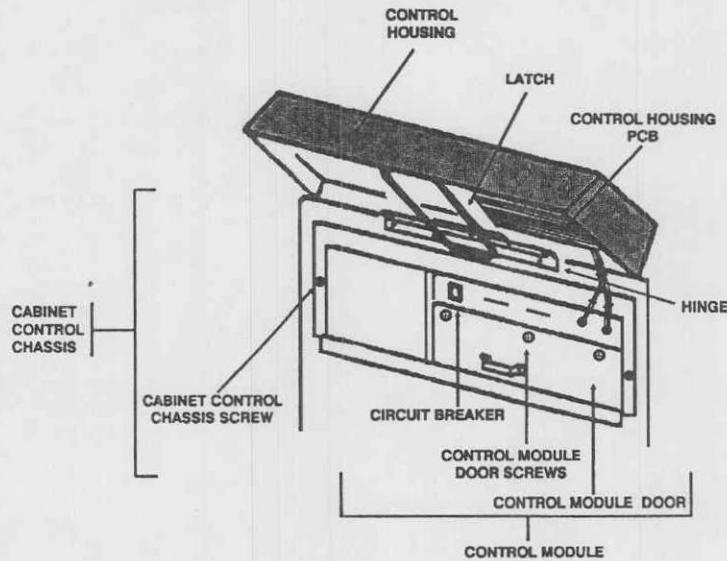


Figure 3-6. Cabinet control chassis (power supply).

(5) Open the control module door by removing the three screws from the top of the door.

WARNING

Prevent electrical shock, injury, or death by avoiding contact with the electrical circuitry.

c. Place a digital voltmeter negative probe on test point "GNDA" and the positive probe on connector J1 labeled "+5VP" on the PCB.

d. Adjust the +5 VDC potentiometer until the voltmeter indicates $+5.00 \text{ VDC} \pm 0.01 \text{ VDC}$.

NOTE

The +5 VDC potentiometer is located at the bottom of the power supply inside the control module. A small flat-blade screwdriver is required for this adjustment.

e. Connect a digital voltmeter negative probe to test point "GNDA" and the positive probe to test point "2.5V" on the PCB. (Refer to fig 3-8).

f. Also on the PCB, adjust resistor "R17" ("2.5V ADJ") until the voltmeter indicates $2.500 \text{ VDC} \pm 0.005 \text{ VDC}$. (Refer to fig 3-9.)

g. Close the cabinet control chassis by completing the following actions:

(1) Close the control module door and replace the three screws.

(2) Lift the control housing slightly upward to release the latch and then lower it.

(3) Open the storage compartment door.

(4) Twist the screw located in the lower right corner to lock the control housing.

(5) Close the storage compartment door.

h. Depress the power "OFF" switch.

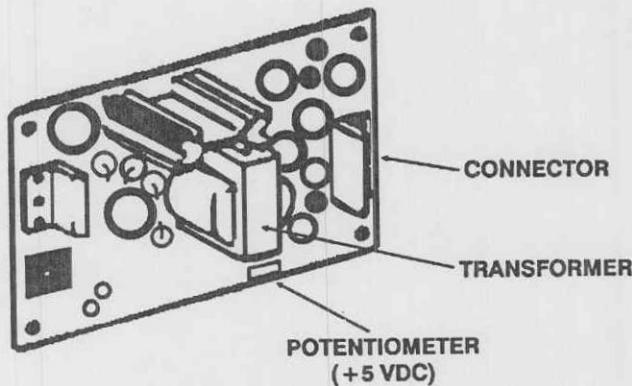


Figure 3-8. Power supply voltage adjustment.

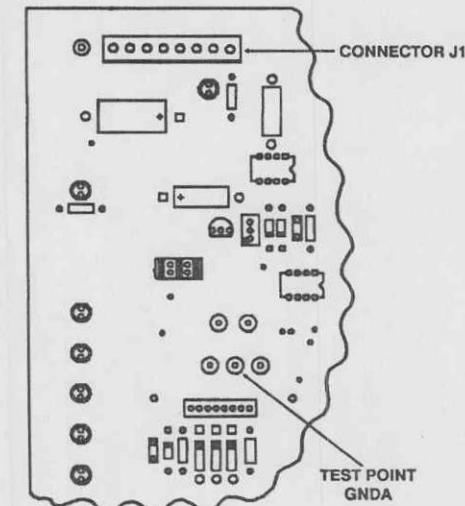


Figure 3-7. Voltage test points (+5 VDC).

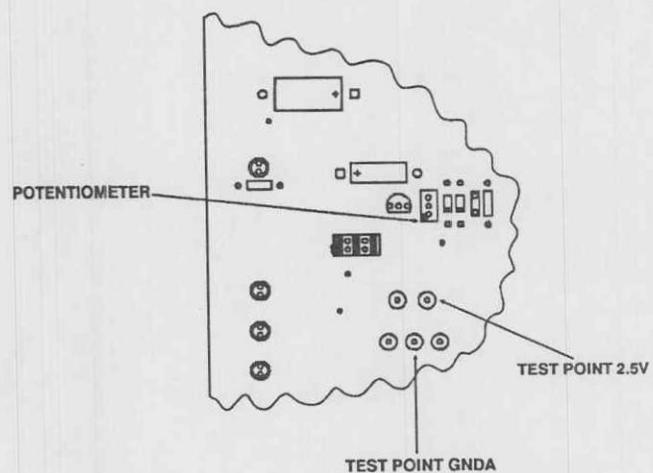


Figure 3-9. Power supply (+2.5 VDC) adjustment.

Section VIII. MAINTENANCE INSTRUCTIONS

3-16. General.

Procedures for adjusting, repairing, or replacing defective assemblies, modules, or components are provided in this section of the manual.

3-17. Door (cabinet).

a. Adjustment (fig 3-10).

- (1) Loosen the two hex head screws on both the upper and lower hinge mounting brackets.
- (2) Arrange blocking under the lower edge of the door to align it with the front of the cabinet.
- (3) Tighten the hex head screws.
- (4) Ensure that the door alignment is correct or repeat steps (1) through (3) again.

b. Gasket removal and replacement (fig 3-11).

- (1) Ensure that the warming cabinet is off by depressing the power "OFF" switch.
- (2) Open the door fully and stabilize it with blocking.
- (3) Lift the edge of the shelf gasket to expose the mounting strip and the Phillips-head screws.
- (4) Remove the screws and then remove the mounting strip and shelf gasket.
- (5) Lift the edge of the door gasket to expose the mounting strips and the Phillips-head screws. Sequentially remove the screws, mounting strips, and door gasket.
- (6) Clean the edge of the inner door panel with a mild cleaning agent.
- (7) Insert the mounting strips into the new gaskets.
- (8) Install new gaskets by sequentially replacing the screws around the gaskets.

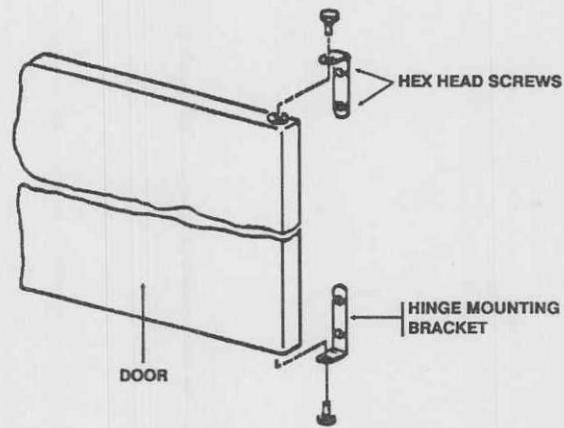


Figure 3-10. Door brackets.

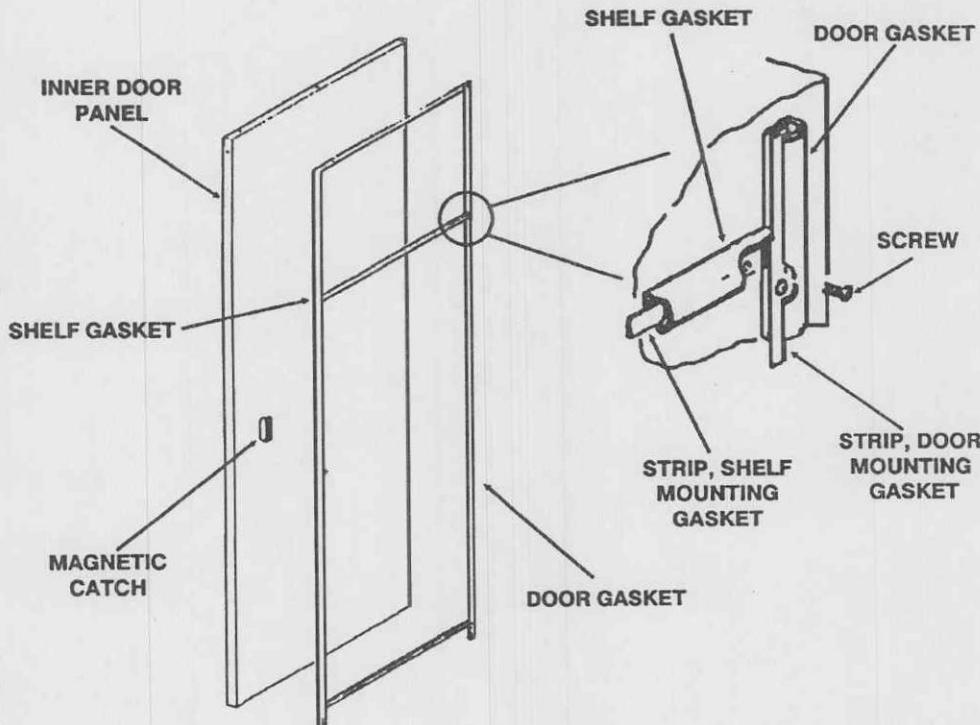


Figure 3-11. Door and shelf gaskets.

c. Door swing conversion (fig 3-12 through fig 3-15). The warming cabinet door may be converted from right hand to left hand or left hand to right hand swing. Conversion procedures are as follows:

(1) Remove the upper and lower hinge pins while holding the door closed against the cabinet. Remove the door and set it aside.

(2) Remove the two hex head screws from both the upper and lower hinge mounting brackets.

(3) Remove the two sets of screws, trim washers, and stiffeners from the opposite side of the warming cabinet and reinstall them in the holes where the upper and lower hinge mounting brackets were just removed.

(4) In turn, reinstall the hinge mounting brackets on the opposite side using the two screws previously removed from each bracket.

(5) Remove the three screws and the door striker plate assembly.

(6) Remove the three washer-head screws from the identical mounting position of the opposite side panel and reinstall them where the door striker panel assembly was removed in the preceding step.

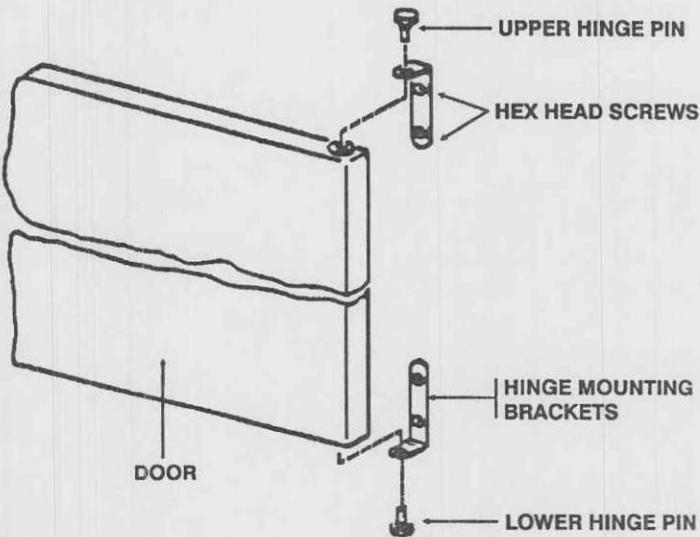


Figure 3-12. Door hinges.

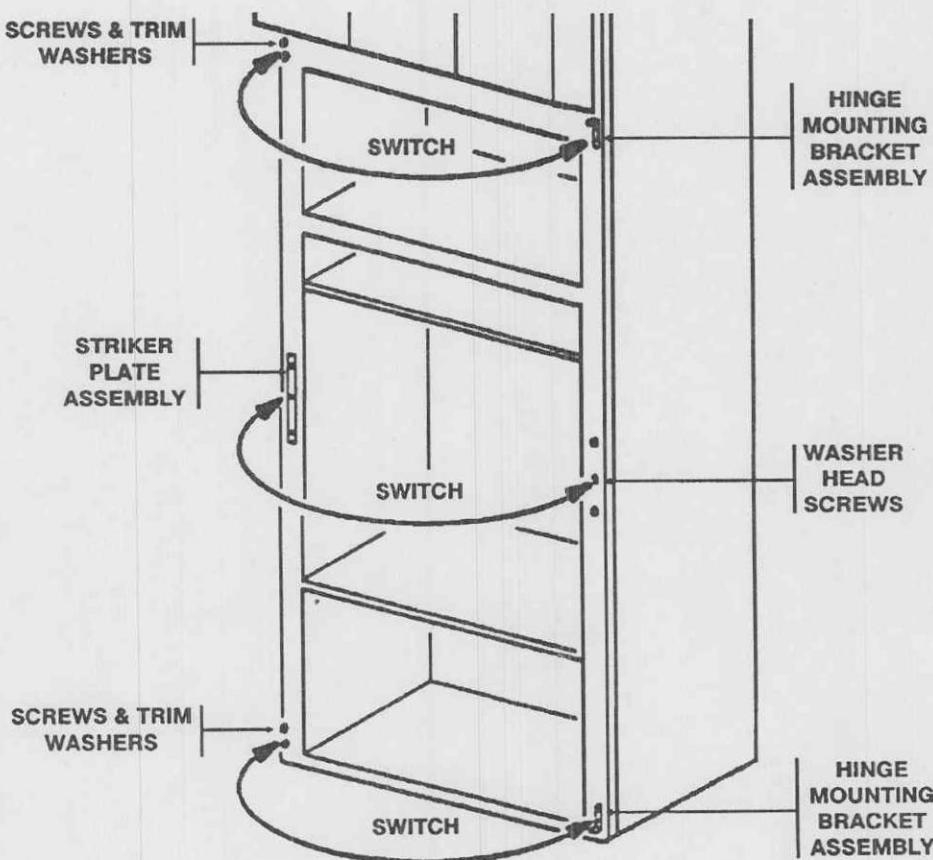


Figure 3-13. Door components.

(7) Reinstall the door striker plate assembly with the three screws.

(8) Lift the edge of the shelf gasket and the door gasket to expose the mounting strips and the Phillips-head screws. Sequentially remove the 45 screws.

(9) Release the nameplate by removing the two tinnerman nuts, rotate the nameplate 180 degrees, and reinstall the nameplate.

(10) Remove the screw and trim washer directly below the door handle.

(11) Remove the upper screw that fastens the door handle.

(12) Loosen the lower door handle screw and carefully allow the door handle to swing downward.

(13) Reinstall the screw to fasten the lower end of the door handle.

(14) Rotate the door 180 degrees.

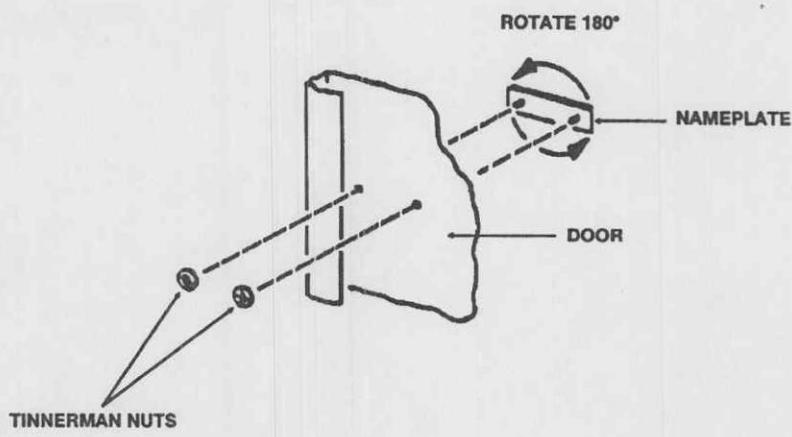


Figure 3-14. Manufacturer nameplate.

CAUTION

Do not rotate the shelf and door gaskets.

(15) Ensure that the inner edge of the door panel is clean before mounting the gasket.

(16) Reinstall the shelf and door gaskets by sequentially replacing the screws around the gaskets.

(17) Reinstall the door using the two hinge pins.

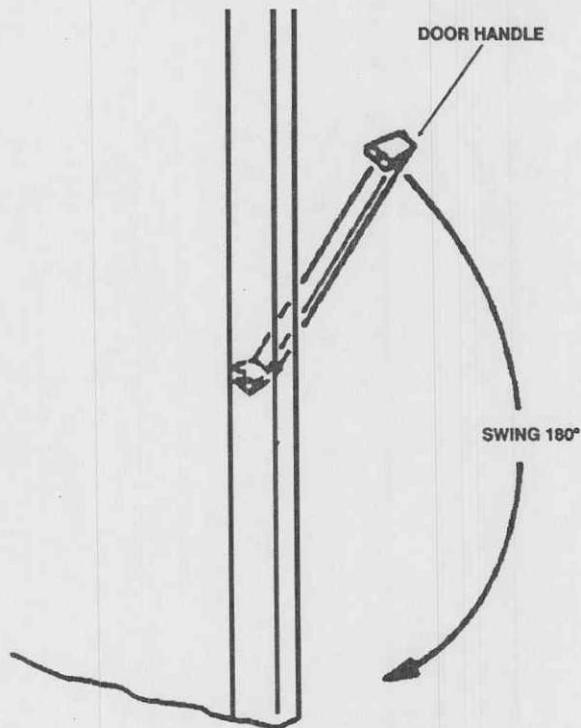


Figure 3-15. Door handle.

3-18. Transformer (fig 3-16 and fig 3-17).

a. Disassembly.

- (1) Disconnect the electrical power to the warming cabinet.
- (2) Access the cabinet control chassis by completing the following actions:
 - (a) Open the storage compartment door.
 - (b) Twist the screw located in the lower right corner to release the control housing.
 - (c) Close the storage compartment door.
 - (d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.
 - (e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.
 - (f) Remove the fastening screw from each side of the cabinet control chassis.
 - (g) Pull the cabinet control chassis forward on its track until it stops against its locking device.
 - (h) Open the control module door by removing the three screws from the top of the door.

- (3) Disconnect the wires from the transformer.
- (4) Remove the two nuts, washers, and bolts fastening the transformer and then remove the transformer.

b. Assembly.

- (1) Install a replacement transformer and replace the two bolts, washers, and nuts.
- (2) Reconnect the wires to the transformer.
- (3) Close the cabinet control chassis by completing the following actions:
 - (a) Close the control module door and replace the three screws.
 - (b) Push the cabinet control chassis backward on its track.
 - (c) Replace the fastening screw on each side of the cabinet control chassis.
 - (d) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.
 - (e) Lift the control housing slightly upward to release the latch and then lower it.

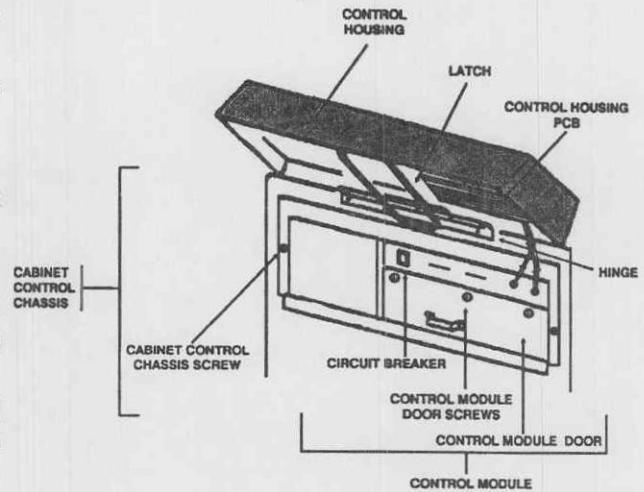


Figure 3-16. Cabinet control chassis (transformer).

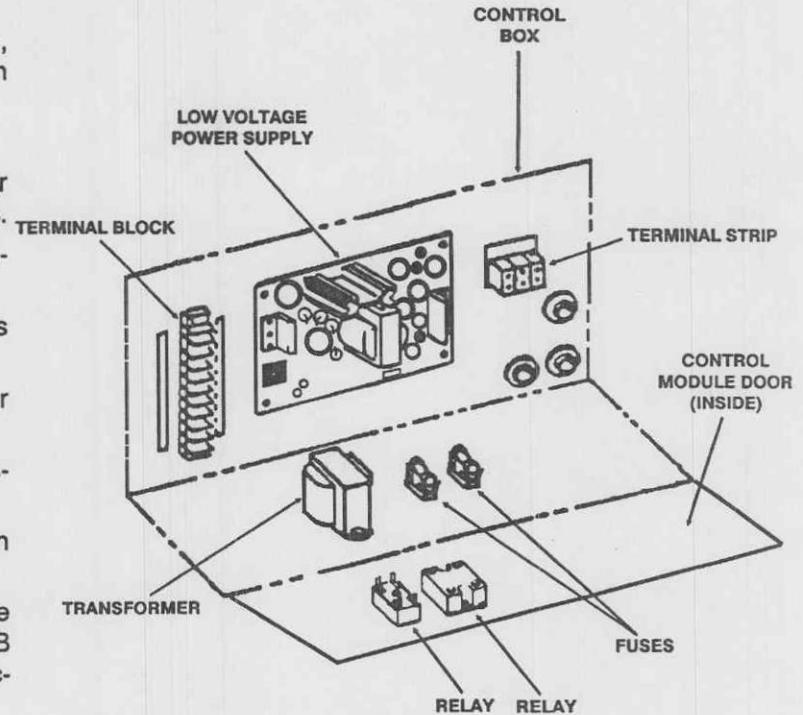


Figure 3-17. Transformer.

- (f) Open the storage compartment door.
- (g) Twist the screw located in the lower right corner to lock the control housing.
- (h) Close the storage compartment door.

(4) Reconnect the electrical power to the cabinet.

(5) Test the cabinet and verify the calibrations as specified in paragraph 3-15.

3-19. Low voltage power supply (fig 3-18 and fig 3-19).

a. Disassembly.

(1) Disconnect the electrical power to the warming cabinet.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from each side of the cabinet control chassis.

(g) Pull the cabinet control chassis forward on its track until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.

(j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.

(k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.

(l) Close the control module door and temporarily replace one of the three screws.

(m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.

(n) Open the control module door by removing the screw temporarily holding the door closed.

(3) Remove the electrical plugs from the low voltage power supply.

(4) Remove the four nuts, washers, and screws that fasten the power supply to the rear wall of the control module, and remove the defective power supply.

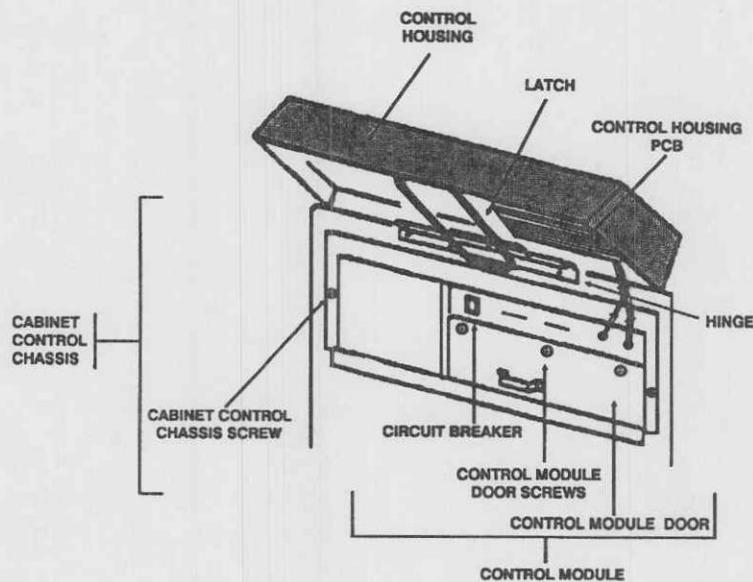


Figure 3-18. Cabinet control chassis (low voltage power supply).

b. Assembly.

(1) Install a replacement power supply and replace the four screws, spacers, washers, and nuts.

(2) Reconnect the electrical plugs to the low voltage power supply.

(3) Close the cabinet control chassis by completing the following actions:

(a) Close the control module door and temporarily replace TERMINAL BLOCK one of the three screws.

(b) Lift the cabinet control chassis onto its mounting and push it rearward while simultaneously pushing it downward into its mounting.

(c) Open the control module door by removing the screw temporarily holding the door closed.

(d) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.

(e) Pull the power supply wires through the cable bushing into the control module.

(f) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.

(g) Close the control module door and replace the three screws.

(h) Push the cabinet control chassis into the warming cabinet.

(i) Replace the fastening screw on each side of the cabinet control chassis.

(j) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

(k) Lift the control housing slightly upward to release the latch and then lower it.

(l) Open the storage compartment door.

(m) Twist the screw located in the lower right corner to lock the control housing.

(n) Close the storage compartment door.

(4) Reconnect the electrical power to the unit.

(5) Test the cabinet and verify the calibrations as specified in paragraphs 3-15.

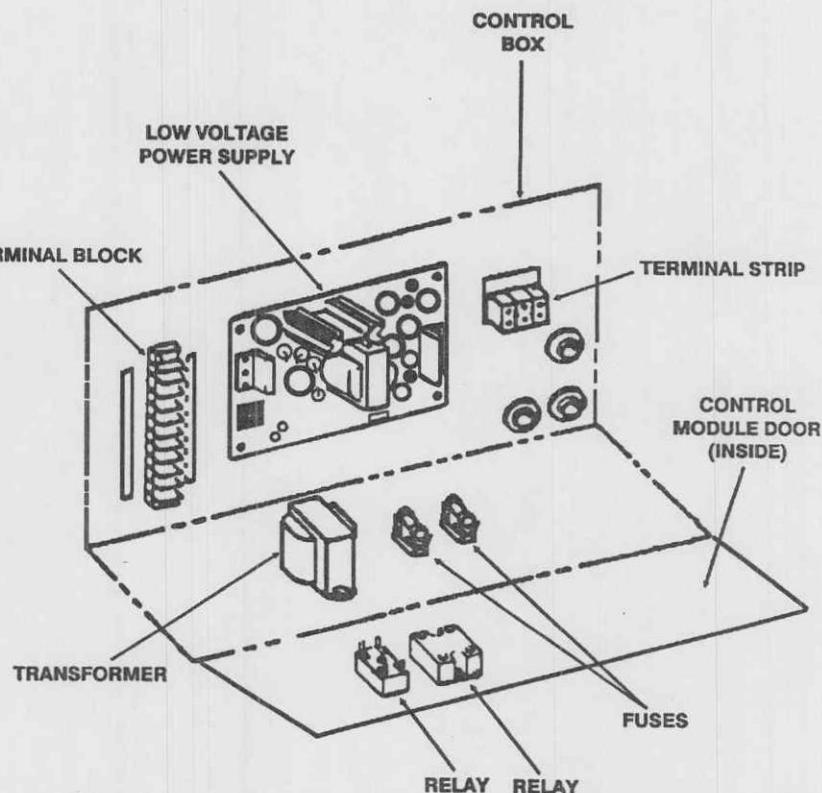


Figure 3-19. Low voltage power supply.

3-20. Fans (fig 3-20 and fig 3-21).

a. Disassembly.

(1) Disconnect the electrical power to the warming cabinet.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from each side of the cabinet control chassis.

(g) Pull the cabinet control chassis forward on its track until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.

(j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.

(k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.

(l) Close the control module door and temporarily replace one of the three screws.

(m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.

(n) Remove the three screws from the heater compartment cover and then remove the cover.

(3) Disconnect the electrical plugs from the fan.

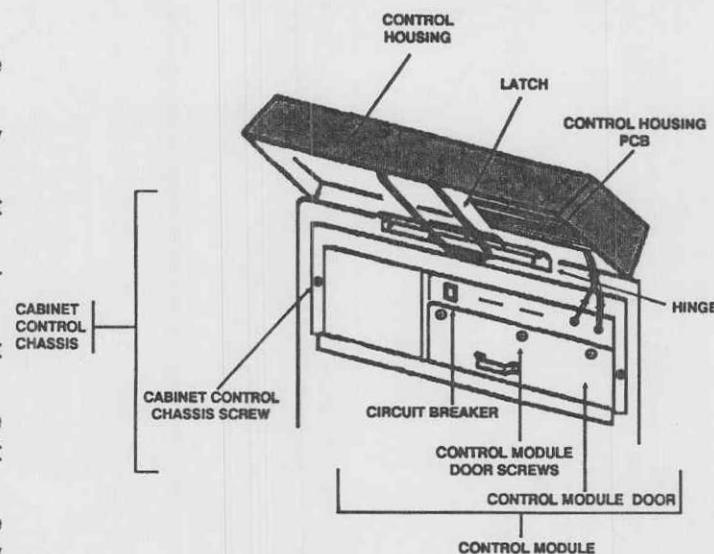


Figure 3-20. Cabinet control chassis (fans).

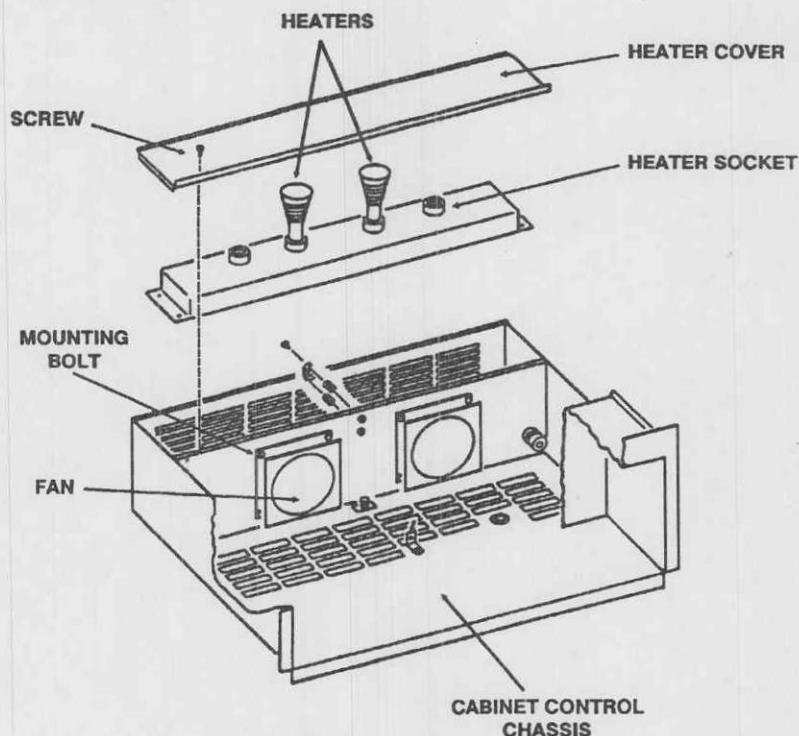


Figure 3-21. Fans.

(4) Remove the four nuts, washers, and screws that fasten the fan to the compartment wall and then remove the fan.

b. Assembly.

- (1) Install a replacement fan and fasten it with the four screws, washers, and nuts.
- (2) Reconnect the electrical plugs to the fan.
- (3) Close the cabinet control chassis by completing the following actions:
 - (a) Reinstall the heater compartment cover and replace the three screws.
 - (b) Lift the cabinet control chassis onto its mounting by pushing it rearward while simultaneously pushing it downward into its mounting.
 - (c) Open the control module door by removing the screw temporarily holding the door closed.
 - (d) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.
 - (e) Pull the power supply wires through the cable bushing and into the control module.
 - (f) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.
 - (g) Close the control module door and replace the three screws.
 - (h) Push the cabinet control chassis into the warming cabinet.
 - (i) Replace the fastening screw on each side of the cabinet control chassis.
 - (j) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.
 - (k) Lift the control housing slightly upward to release the latch and then lower it.
 - (l) Open the storage compartment door.
 - (m) Twist the screw located in the lower right corner to lock the control housing.
 - (n) Close the storage compartment door.
- (4) Reconnect the electrical power to the cabinet.
- (5) Test the warming cabinet for operation of the fans as specified in paragraph 3-11.

3-21. Heaters (fig 3-22 and fig 3-23).

a. Disassembly.

- (1) Disconnect the electrical power to the warming cabinet.
- (2) Access the cabinet control chassis by completing the following actions:
 - (a) Open the storage compartment door.
 - (b) Twist the screw located in the lower right corner to release the control housing.
 - (c) Close the storage compartment door.
 - (d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.
 - (e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.
 - (f) Remove the fastening screw from each side of the cabinet control chassis.

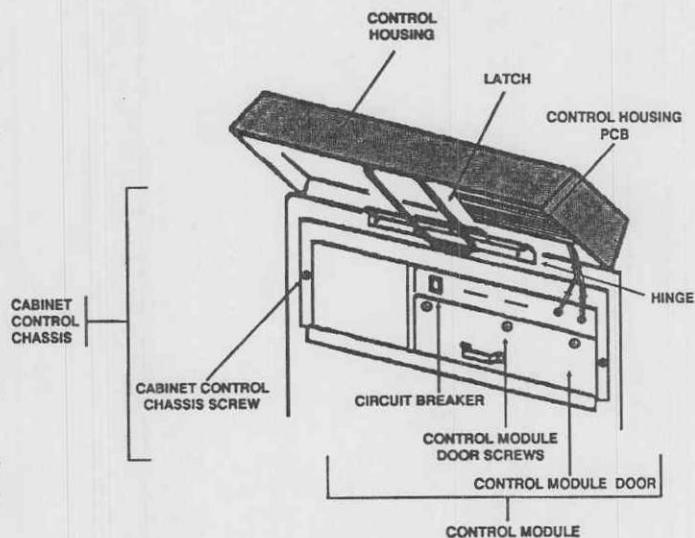


Figure 3-22. Cabinet control chassis (heaters).

- (g) Pull the cabinet control chassis forward on its track until it stops against its locking device.
- (h) Open the control module door by removing the three screws from the top of the door.
- (i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.
- (j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.
- (k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.
- (l) Close the control module door and temporarily replace one of the three screws.
- (m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.
- (n) Remove the three screws from the heater compartment cover and then remove the cover.

(3) Unscrew the defective heater from its socket.

NOTE

Two heaters are used to operate the cabinet.

b. Assembly.

- (1) Screw a replacement heater into the same socket from which the defective heater was removed.
- (2) Close the cabinet control chassis by completing the following actions:
 - (a) Reinstall the heater compartment cover and replace the three screws.
 - (b) Lift the cabinet control chassis onto its mounting by pushing it rearward while simultaneously pushing it downward into its mounting.
 - (c) Open the control module door by removing the screw temporarily holding the door closed.
 - (d) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.
 - (e) Pull the power supply wires through the cable bushing and into the control module.
 - (f) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.
 - (g) Close the control module door and replace the three screws.
 - (h) Push the cabinet control chassis into the warming cabinet.
 - (i) Replace the fastening screw on each side of the cabinet control chassis.
 - (j) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

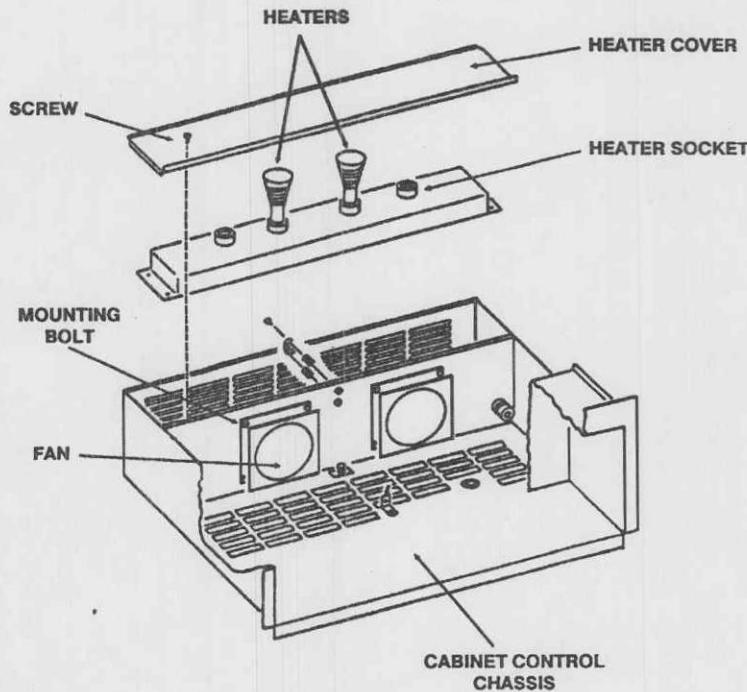


Figure 3-23. Heaters.

- (k) Lift the control housing slightly upward to release the latch and then lower it.
- (l) Open the storage compartment door.
- (m) Twist the screw located in the lower right corner to lock the control housing.
- (n) Close the storage compartment door.
- (3) Reconnect the electrical power to the cabinet.
- (4) Test the cabinet by following the procedures in paragraph 2-2.

3-22. Thermostat (fig 3-24 and fig 3-25).

a. Disassembly.

(1) Disconnect the electrical power to the warming cabinet.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from each side of the cabinet control chassis.

(g) Pull the cabinet control chassis forward on its track until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.

(j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.

(k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.

(l) Close the control module door and temporarily replace one of the three screws.

(m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.

(n) Remove the three screws from the heater compartment cover and then remove the cover.

(3) Remove the electrical plugs from the thermostat.

(4) Remove the two screws fastening the thermostat to the spacers and remove the thermostat.

b. Assembly.

(1) Install a replacement thermostat by positioning it against the spacers and inserting the two screws.

(2) Reconnect the electrical plugs to the thermostat.

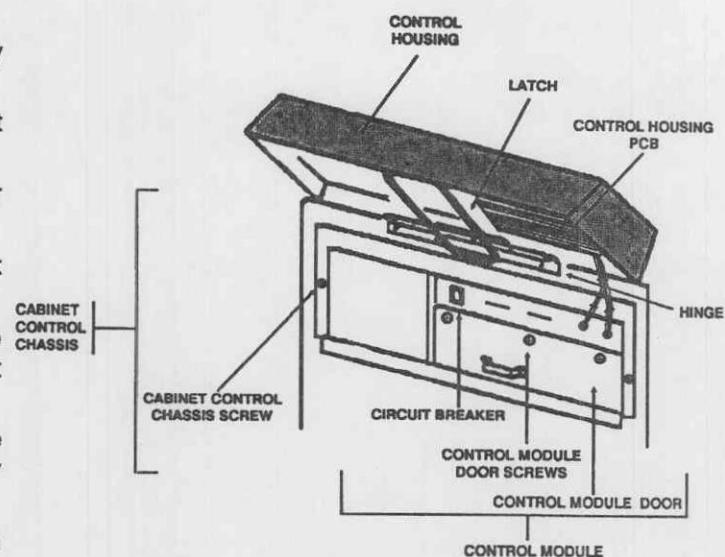


Figure 3-24. Cabinet control chassis (thermostat).

(3) Close the cabinet control chassis by completing the following actions:

(a) Reinstall the heater compartment cover and replace the three screws.

(b) Lift the cabinet control chassis onto its mounting by pushing it rearward while simultaneously pushing it downward into its mounting.

(c) Open the control module door by removing the screw temporarily holding the door closed.

(d) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.

(e) Pull the power supply wires through the cable bushing and into the control module.

(f) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.

(g) Close the control module door and replace the three screws.

(h) Push the cabinet control chassis into the warming cabinet.

(i) Replace the fastening screw on each side of the cabinet control chassis.

(j) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.

(k) Lift the control housing slightly upward to release the latch and then lower it.

(l) Open the storage compartment door.

(m) Twist the screw located in the lower right corner to lock the control housing.

(n) Close the storage compartment door.

(4) Reconnect the electrical power to the cabinet.

(5) Test the cabinet by following the procedures in paragraph 2-2.

3-23. Temperature sensor (fig 3-26):

a. Disassembly.

(1) Disconnect the electrical power to the warming cabinet.

(2) Access the cabinet control chassis by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

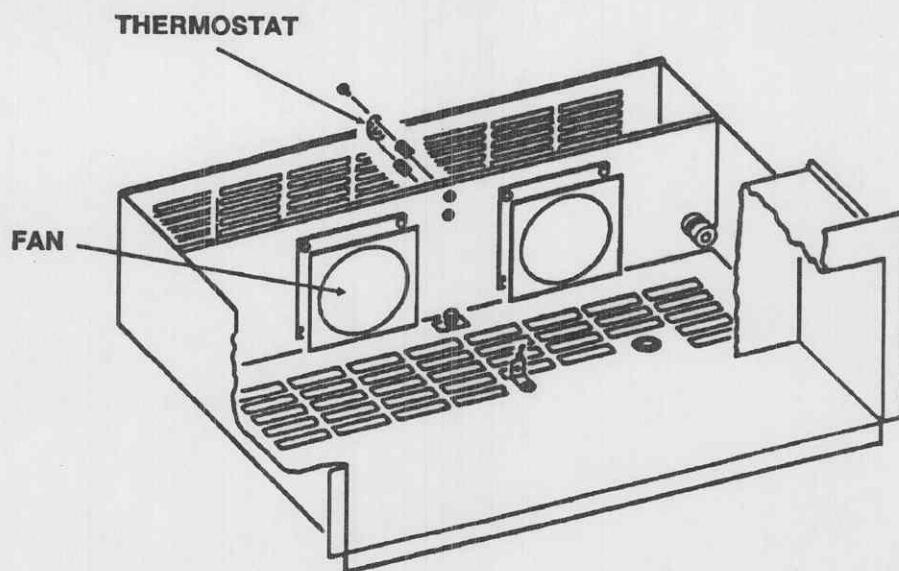


Figure 3-25. Thermostat.

(e) Disconnect the control module electrical cables from the control housing PCB by pulling them from their mating connectors.

(f) Remove the fastening screw from each side of the cabinet control chassis.

(g) Pull the cabinet control chassis forward on its tracks until it stops against its locking device.

(h) Open the control module door by removing the three screws from the top of the door.

(i) Disconnect the blue, brown, and green power supply wires from the terminal strip on the back wall of the control module. Note the initial location of each wire.

(j) Pull the power supply wires out of the control module through the cable bushing into the fan compartment.

(k) Disconnect the door switch electrical cable and push it down through the cable bushing in the bottom of the fan compartment.

(l) Close the control module door and temporarily replace one of the three screws.

(m) Pull upward on the cabinet control chassis to release it while simultaneously pulling it forward from the warming cabinet. Place it on a work surface or the floor.

(3) Disconnect the wires from the temperature sensor.

(4) Loosen the nut that fastens the sensor to the mounting bracket.

(5) Remove the temperature sensor.

b. Assembly.

(1) Install a new temperature sensor into the mounting bracket.

(2) Tighten the nut on the sensor mounting bracket.

(3) Reconnect the wires to the temperature sensor.

NOTE

Ensure that the temperature sensor extends $1/8$ inch below the grill of the cabinet control chassis.

(4) Close the fan cabinet control chassis by completing the following actions:

(a) Lift the cabinet control chassis onto its mounting by pushing it rearward while simultaneously pushing it downward into the mounting.

(b) Open the control module door by removing the screw temporarily holding the door closed.

(c) Pull the door switch electrical cable upward through the cable bushing in the bottom of the fan compartment and reconnect it.

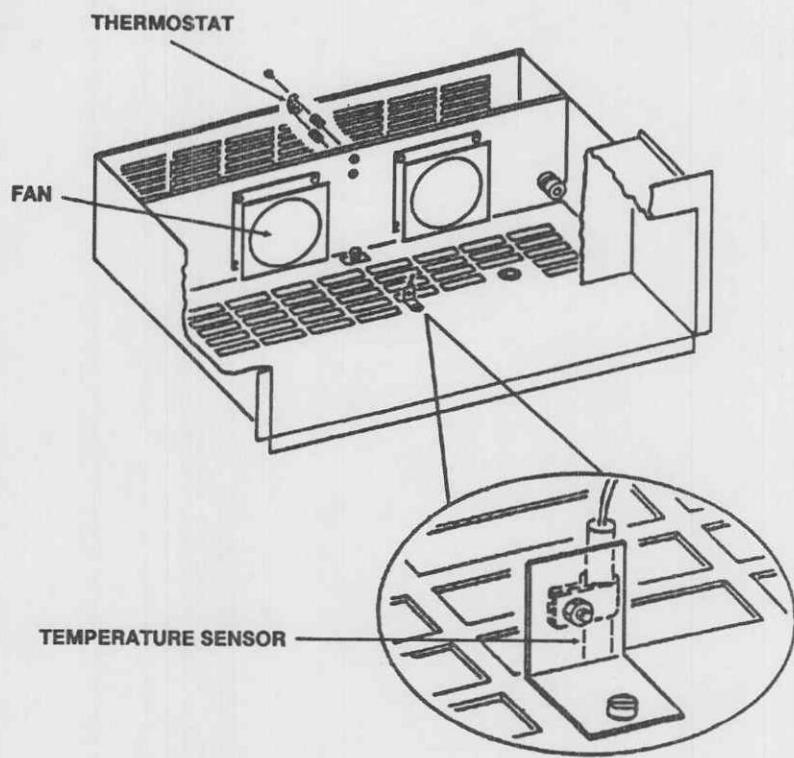


Figure 3-26. Temperature sensor.

- (d) Pull the power supply wires through the cable bushing and into the control module.
- (e) Reconnect the blue, brown, and green power supply wires to the terminal strip on the back wall of the control module.
- (f) Close the control module door and replace the three screws.
- (g) Push the cabinet control chassis into the warming cabinet.
- (h) Replace the fastening screw on both sides of the cabinet control chassis.
- (i) Reconnect the control module electrical cables to the control housing PCB by fastening them to their mating connectors.
- (j) Lift the control housing slightly upward to release the latch and then lower it.
- (k) Open the storage compartment door.
- (l) Twist the screw located in the lower right corner to lock the control housing.
- (m) Close the storage compartment door.
- (n) Reconnect the electrical power to the cabinet.

(5) Test the cabinet by following the procedures in paragraph 2-2.

3-24. Relays (fig 3-27 and fig 3-28).

a. Disassembly.

- (1) Disconnect the electrical power to the warming cabinet.
- (2) Access the cabinet control chassis by completing the following actions:
 - (a) Open the storage compartment door.
 - (b) Twist the screw in the lower right corner to release the control housing.
 - (c) Close the storage compartment door.
 - (d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.
 - (e) Open the control module door by removing the three screws from the top of the door.
- (3) Disconnect the electrical wires from the defective relay after noting the position of each wire.
- (4) Remove the hardware fastening the relay and then remove the relay.

b. Assembly.

- (1) Apply a generous amount of insulating compound (heat sink) to the base of the replacement relay and position it for mounting. Replace the hardware to fasten it.
- (2) Reconnect the electrical wires to the relay terminals.

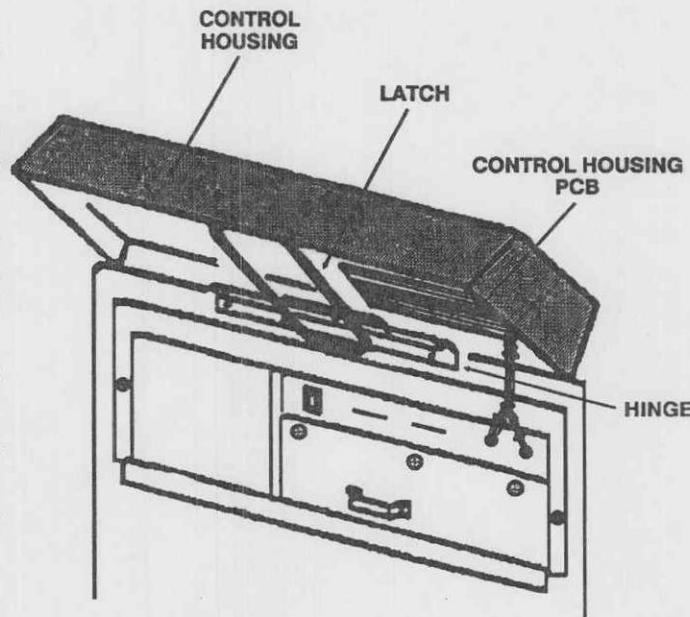


Figure 3-27. Cabinet control chassis (relays).

CAUTION

To prevent possible fire damage caused by the heating of electrical wires, eliminate the possibility of any faulty connections by ensuring that the connectors are properly crimped and the screws for wire termination are securely tightened.

(3) Close the cabinet control chassis by completing the following actions:

(a) Close the control module door and replace the three screws.

(b) Lift the control housing slightly upward to release the latch and then lower it.

(c) Open the storage compartment door.

(d) Twist the screw located in the lower right corner to lock the control housing.

(e) Close the storage compartment door.

(4) Reconnect the electrical power to the cabinet.

(5) Test the cabinet for proper operation by following the procedures in paragraph 2-2.

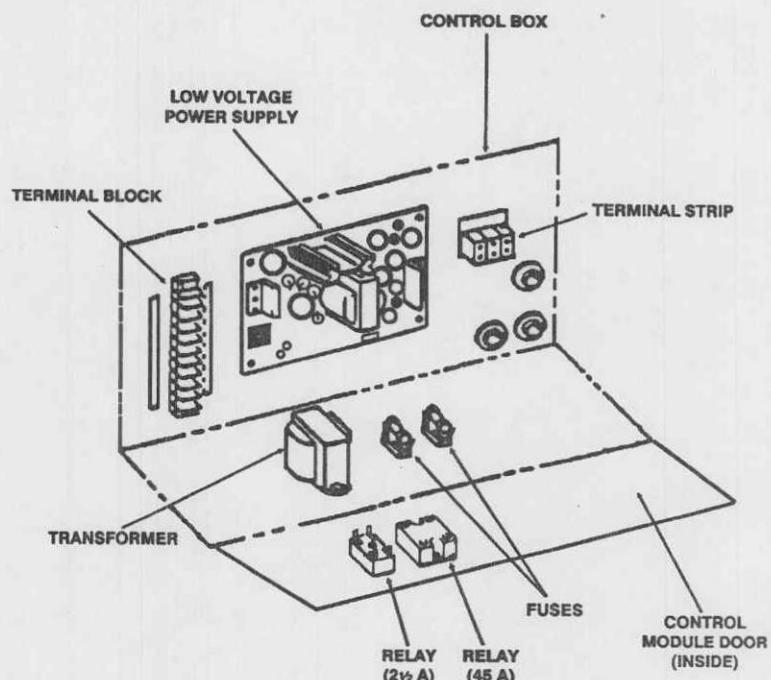


Figure 3-28. Relays.

3-25. Control housing PCB (fig 3-29 and fig 3-30).

a. Disassembly.

(1) Access the control housing PCB by completing the following actions:

(a) Open the storage compartment door.

(b) Twist the screw located in the lower right corner to release the control housing.

(c) Close the storage compartment door.

(d) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

(2) Depress the circuit breaker switch to the "OFF" position.

(3) Disconnect the control module electrical cables from the PCB by gently pulling the electronic connectors apart. Note the position of each connector for reassembly.

CAUTION

Use an electrostatic discharge control device to preclude damage to the PCB during subsequent handling.

(4) Remove the four screws from the PCB mounting brackets and then remove the PCB.

(5) Disconnect the control panel ribbon from the "J2" connector.

(6) Separate the PCB from the control panel by removing the fastening screws.

NOTE

The spacers will remain fastened to the control panel.

b. Assembly.

(1) Reassemble the replacement PCB to the control panel.

(2) Remove the erasable programmable read-only memory (EPROM) device from the defective PCB and install it on the replacement PCB.

CAUTION

The EPROM dot (or notch) should point to the right and align with the notch on socket "U12" to correctly install the EPROM.

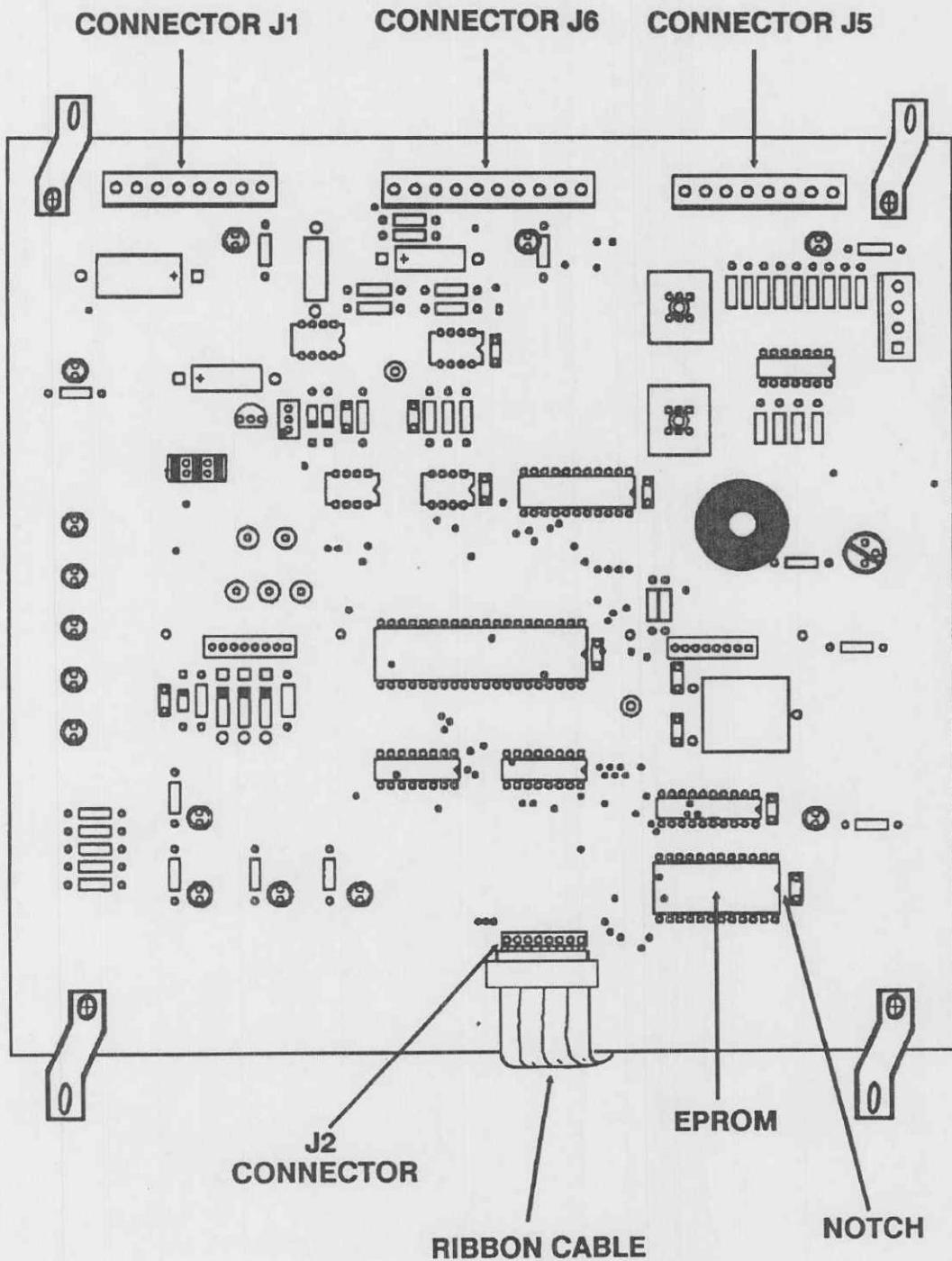


Figure 3-29. Printed circuit board.

(3) Reconnect the control panel ribbon to the "J2" connector on the PCB.

(4) Reinstall the PCB and replace the four screws into the mounting brackets.

(5) Reconnect the control module electrical cables.

(6) Depress the circuit breaker switch to the "ON" position.

(7) Close the cabinet control chassis by completing the following actions:

(a) Lift the control housing slightly upward to release the latch and then lower it.

(b) Open the storage compartment door.

(c) Twist the screw located in the lower right corner to lock the control housing.

(d) Close the storage compartment door.

(8) Test the cabinet for proper operation by following the procedures in paragraph 2-2 and paragraph 3-15.

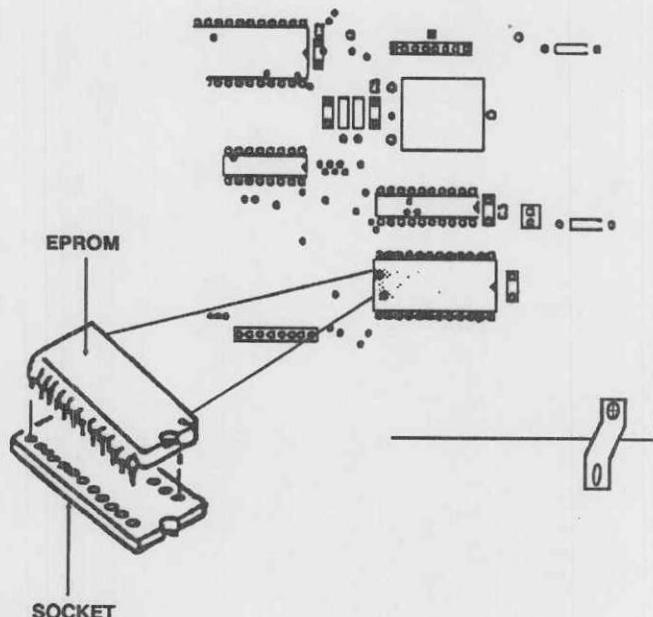


Figure 3-30. EPROM.

Section IX. TEMPERATURE SCALES

3-26. Fahrenheit scale.

The warming cabinet is initially set to operate using the Fahrenheit scale. The electrical connector jumper configuration is set up for Fahrenheit temperature displays.

3-27. Temperature scale conversion (fig 3-31).

a. Access the cabinet control chassis by completing the following actions:

(1) Open the storage compartment door.

(2) Twist the screw located in the lower right corner to release the control housing.

(3) Close the storage compartment door.

(4) Pull forward on the bottom of the control housing, which is hinged at the top, to lift and latch the housing.

b. Depress the circuit breaker switch to the "OFF" position.

c. Locate jack "J4" and note the terminal jumpers.

NOTE

The electrical jumpers are required in the first and third positions for the warming cabinet to operate.

d. Ensure that a jumper is installed in the fifth position for operation of the warming cabinet on the Fahrenheit scale or remove the jumper in the fifth position for operation on the Celsius scale.

NOTE

Figure 3-31 shows the jumper installed in the fifth position for operation of the warming cabinet on the Fahrenheit scale.

e. Depress the circuit breaker switch to the "ON" position.

f. Close the cabinet control chassis by completing the following actions:

(1) Lift the control housing slightly upward to release the latch and then lower it.

(2) Open the storage compartment door.

(3) Twist the screw located in the lower right corner to lock the control housing.

(4) Close the storage compartment door.

g. Depress the power "ON" switch and observe the temperature displays for the correct temperature scale.

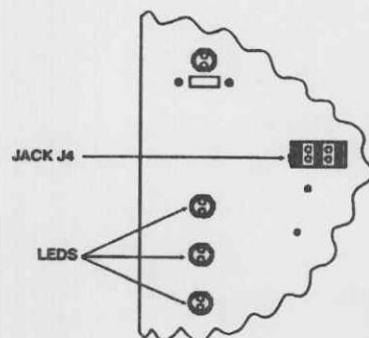


Figure 3-31. Temperature scale conversion.

Section X. STORAGE AND SHIPMENT PROCEDURES

3-28. Preparation for storage.

This section contains the procedures for preparing the warming cabinet for storage within an ISO shelter.

a. Ensure that the warming cabinet is empty.

b. Turn off the circuit breaker by completing the following actions:

(1) Open the storage compartment door.

(2) Twist the screw in the lower right corner to release the control housing.

(3) Close the storage compartment door.

(4) Pull forward on the bottom of the control housing, which is hinged at the top, and lift it upward.

(5) Depress the circuit breaker to the "OFF" position.

(6) Lift the control housing slightly upward to release the latch and then lower it.

(7) Open the storage compartment door.

(8) Twist the screw located in the lower right corner to lock the control housing.

(9) Close the storage compartment door.

c. Clean the warming cabinet. (Refer to chap 2, sec IV.)

3-29. Preparation for shipment.

This section contains the instructions for preparing the warming cabinet for shipment outside of its ISO shelter.

CAUTION

To preclude damage to the ISO shelter or to the warming cabinet, do not remove the unit from the ISO shelter, or disassemble or crate it without assistance from support level maintenance.

a. Ensure that the warming cabinet is empty.

b. Remove the two adjustable shelves and place them on the bottom of the warming cabinet.

c. Disconnect electrical power to the warming cabinet.

d. Remove the cover plate of the electrical power junction box.

e. Loosen the screws in the terminal block (fig 3-32) and remove the electrical power cable.

f. Replace the cover plate.

g. Transfer the warming cabinet to the supporting activity for crating and shipping.

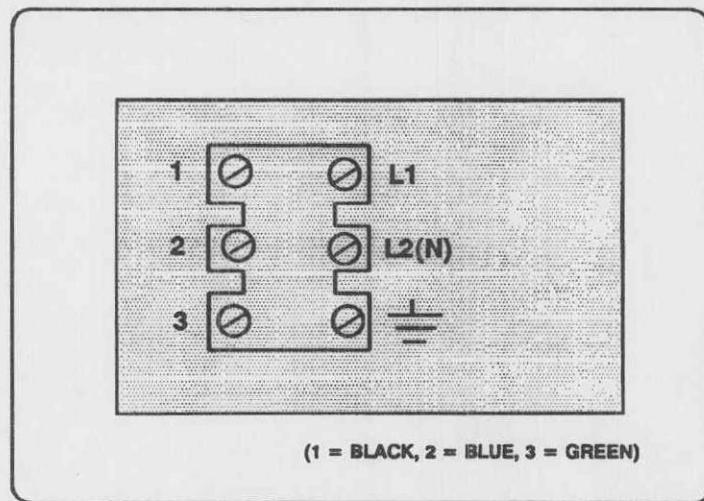


Figure 3-32. Terminal block.

CHAPTER 4

DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

Section I. GENERAL INFORMATION

4-1. Overview.

This chapter provides for maintenance that is beyond the capability, capacity, and authorization for unit level maintenance personnel. The procedures in this chapter should not be attempted at the unit level.

4-2. Tools and test equipment.

Common tools and test equipment required for support maintenance of the unit are listed in appendix B, section III. Refer to your unit's MTOE or installation table of distribution and allowances (TDA) for authorized items.

4-3. Components of end item and basic issue items.

Components of end item and basic issue items are listed in appendix C, sections II and III.

4-4. Expendable supplies.

Expendable and durable supplies and materials for support maintenance are listed in appendix D, section II.

4-5. Repair parts.

Repair parts required for support maintenance are listed in appendix E, section II.

4-6. Special tools.

Special tools required for support maintenance are listed in appendix E, section III.

4-7. Support maintenance services.

Specific procedures and instructions for support maintenance services are not currently available.

Section II. TROUBLESHOOTING

4-8. General.

Specific troubleshooting procedures for the low voltage power supply and the control housing PCB are not currently available.

Section III. VOLTAGE CONVERSION

4-9. Voltage conversion procedures.

Wiring diagrams to indicate the electrical connections for 120-volt and 240-volt operation are provided in figure 4-1 and figure 4-2.

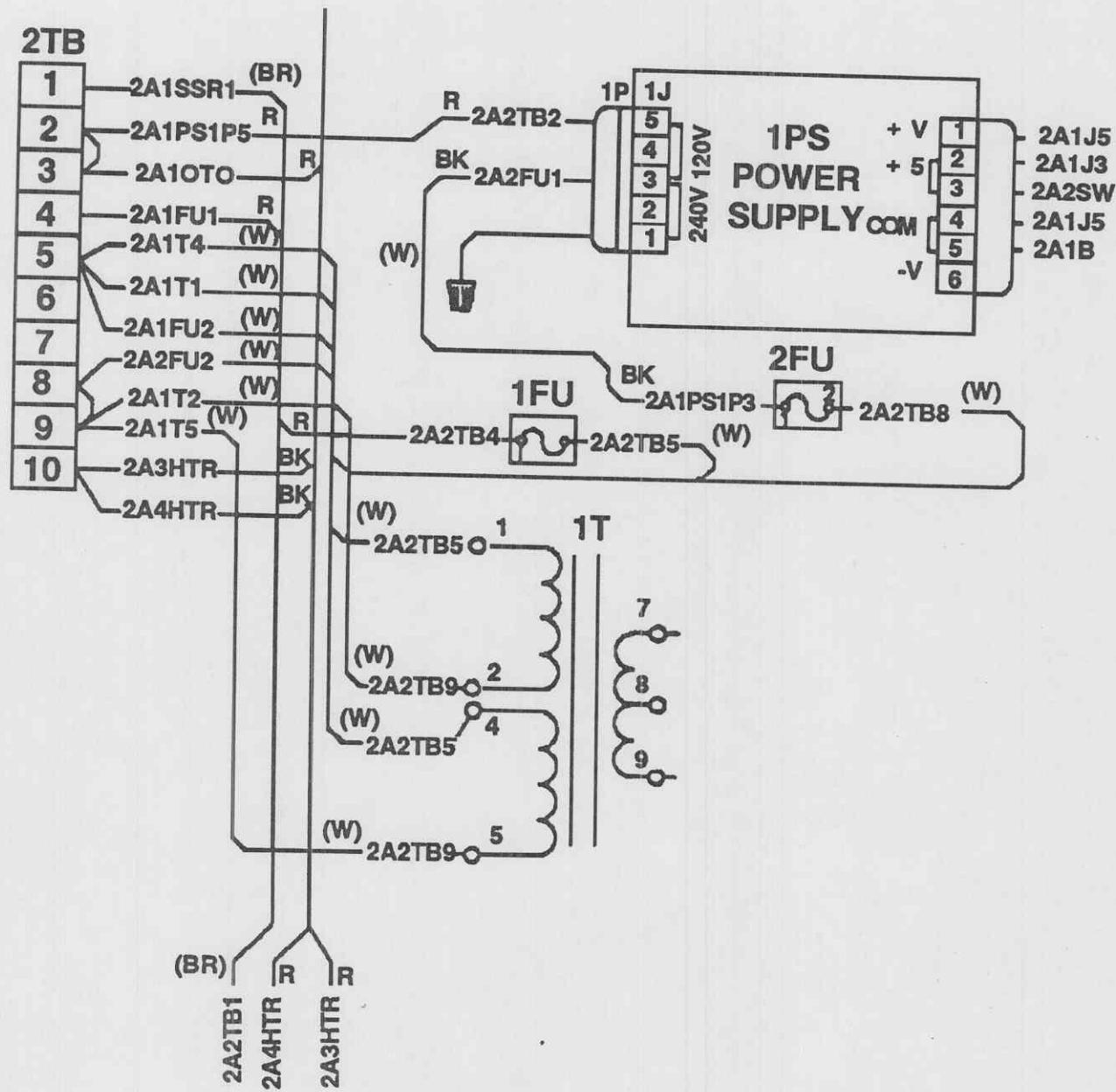


Figure 4-1. Electrical connections for 120-volt operation.

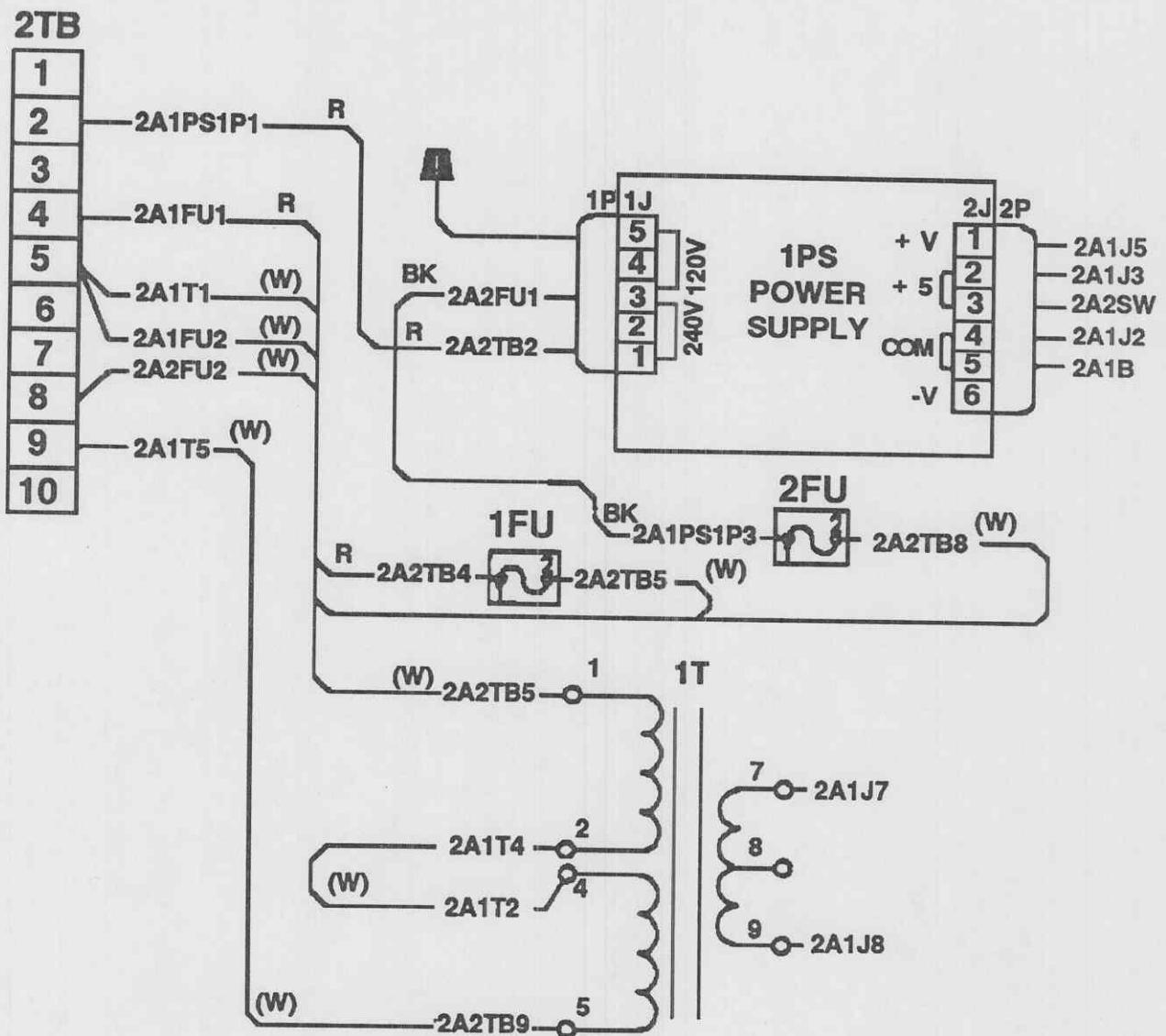


Figure 4-2. Electrical connections for 240-volt operation.

APPENDIX A

REFERENCES

A-1. Army regulations.

AR 40-61	Medical Logistics Policies and Procedures
AR 710-2	Supply Policy Below the Wholesale Level
AR 725-50	Requisitioning, Receipt, and Issue System

A-2. Technical manual.

TM-DPSC-6500-RPL	Medical Materiel: Medical Repair Parts Reference List
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A-3. Technical bulletins.

TB 8-6500-MPL	Mandatory Parts List for Medical Equipment
TB 38-750-2	Maintenance Management Procedures for Medical Equipment
TB 740-10/DLAM 4155.5/AFR 67-43	Quality Control, Depot Storage Standards, Appendix M, Medical Supplies
TB 750-8-1	Maintenance Expenditure Limits for Medical Materiel: FSC Groups (Medical Only)

A-4. Field manual.

FM 21-11	First Aid for Soldiers
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A-5. Supply bulletin.

SB 8-75-()-series	Army Medical Department Supply Information
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A-6. Other publications.

(These publications may be obtained from Commander, U.S. Army Medical Materiel Agency, ATTN: SGMMA-M, Frederick, MD 21702-5001.)

- Installation Package, MDT Biologic Company
- Installation Instructions, MDT Biologic Company
- Operators Manual, MDT Biologic Company
- Service Manual, MDT Biologic Company
- Parts Catalog, MDT Biologic Company

APPENDIX B

MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General.

- a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance levels.
- b. Section II designates overall responsibility for the performance of maintenance functions on the identified end item or component. The implementation of the maintenance functions upon the end item or component will be consistent with the assigned maintenance levels.
- c. Section III lists the tools and test equipment required for each maintenance function as referenced from Section II.
- d. Section IV contains supplemental instructions, explanatory notes, and/or illustrations required for a particular maintenance function.

B-2. Explanation of columns in section II.

- a. *Group Number, Column 1.* The assembly group number (Group No.) column is a numerical group assigned to each assembly. The applicable assembly groups are listed in the maintenance allocation chart (MAC) in disassembly sequence beginning with the first assembly removed in a top down disassembly sequence.
- b. *Assembly Group, Column 2.* This column contains a brief description of the components of each assembly group.
- c. *Maintenance Functions, Column 3.* This column lists the various maintenance functions (A through K) and indicates the lowest maintenance level authorized to perform these functions. The symbol designations for the various maintenance levels are as follows:

- C - Operator or crew
- O - Unit maintenance
- F - Direct support maintenance
- H - General support maintenance
- D - Depot maintenance

The maintenance functions are defined as follows:

- A - Inspect. To determine serviceability of an item by comparing its physical, mechanical, and electrical characteristics with established standards.
- B - Test. To verify serviceability and to detect electrical or mechanical failure by use of test equipment.
- C - Service. To clean, to preserve, to charge, and to add lubricants, cooling agents, and air. If it is desired that elements, such as painting and lubricating, be defined separately, they may be so listed.
- D - Adjust. To rectify to the extent necessary to bring into proper operating range.
- E - Align. To adjust specified variable elements of an item to bring it to optimum performance.
- F - Calibrate. To determine the corrections to be made in the readings of instruments or test equipment used in precise measurement. Consists of the comparison of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared with the certified standard.
- G - Install. To set for use in an operational environment such as tents or International Standards Organization shelters.

H - Replace. To replace unserviceable items with serviceable like items.

I - Repair. Those maintenance operations necessary to restore an item to serviceable condition through correction of material damage to a specific failure. Repair may be accomplished at each level of maintenance.

J - Overhaul. Normally the highest degree of maintenance performed by the Army in order to minimize time work in process consistent with quality and economy of operation. It consists of that maintenance necessary to restore an item to completely serviceable condition as prescribed by a maintenance standard in technical publications for each item of equipment. Overhaul normally does not return an item to like new condition.

K - Rebuild. The highest degree of material maintenance. It consists of restoring equipment as nearly as possible to new condition in accordance with original manufacturing standards. Rebuild is performed only when required by operational considerations or other paramount factors and then only at the depot maintenance level.

d. Tools and Equipment, Column 4. This column is provided for referencing by code, the tools and test equipment (sec III) required to perform the maintenance functions.

e. Remarks, Column 5. This column is provided for referencing by code, the remarks (sec IV) pertinent to the maintenance functions.

B-3. Explanation of columns in section III.

a. Reference Code, Column 1. This column correlates to section II, column 4.

b. Maintenance Level, Column 2. This column identifies the maintenance levels using the tools and test equipment.

c. Nomenclature, Column 3. This column identifies the tools and test equipment.

d. National Stock Number, Column 4. This column provides the national stock number of the specific tools or test equipment.

B-4. Explanation of columns in section IV.

a. Reference Code, Column 1. This column correlates to section II, column 5.

b. Remarks, Column 2. This column provides supplemental information or explanatory notes pertinent to the maintenance function in section II.

**Section II. MAINTENANCE ALLOCATION CHART
FOR
WARMING CABINET**

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS												(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K			
00	Warming Cabinet	O 0.5	O 1.2	O 0.6		O 0.3	O 1.2	D 7.0	D 9.0	O 1.5	F 14.0	D 21.0	01,02,03 04,05,06, 07,08	CODE A, B, C	
01	Cabinet												01,02,03	CODE A	
	Panels	O 0.2		O 0.2					O 2.4						
	Door	O 0.1		O 0.1		O 0.3			O 1.2	O 0.8					
	Gaskets	O 0.1		O 0.3					O 1.4						
	Handle	O 0.1							O 0.2						
	Latch	O 0.1			O 0.3				O 0.5						
	Hinges	O 0.1			O 0.4				O 0.6						
02	Electrical Components												01,02,03 04,05	CODE A, B	
	Door Switch	O 0.3							O 0.6						
	Circuit Breaker	O 0.3							O 0.6						
	Temperature Sensor Relay	O 0.3							O 0.6						
	Thermostat Relay	O 0.3							O 0.6						

**Section II. MAINTENANCE ALLOCATION CHART
FOR
WARMING CABINET**

(1) GROUP NO.	(2) ASSEMBLY GROUP	(3) MAINTENANCE FUNCTIONS											(4) TOOLS AND EQUIPMENT	(5) REMARKS
		A	B	C	D	E	F	G	H	I	J	K		
03	Electronic Components	Transformer	O 0.5						O 0.6					
		Fuse	O 0.2						O 0.2					
		Fan(s)	O 0.3						O 0.8					
		Heater(s)	O 0.3						O 0.8					
		Temperature Sensor	O 0.6	O 1.1					O 1.2					
		Thermostat	O 0.6	O 1.1					O 1.2					
		Control Housing PCB	O 0.8	O 0.6					O 1.6	D 1.4		D 2.2		01,02,03 04,05,06 07,08
		Power Supply	O 0.6	O 0.6					O 1.2	O 0.5				
														CODE A, B, C

**Section III. TOOLS AND TEST EQUIPMENT
FOR
WARMING CABINET**

(1) REFERENCE CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL STOCK NUMBER
01	O,F,H,D	Tool Kit, Medical Equipment Maintenance and Repair: Repairmans	5180-00-611-7923
02	O,F,H,D	Tool Kit, Medical Equipment Maintenance and Repair: Organizational	5180-00-611-7924
03	F,H	Shop Equipment, Medical Maintenance: Depot (MEDSOM) Maintenance	4940-00-594-6455
04	O,F,H,D	Multimeter, AN/USM 486 or Multimeter, AN/PSM 45A	6625-01-145-2430 6625-01-265-6000
05	O,F,H,D	Tester, Current Leakage, TS 2514/P	6625-01-142-8233
06	O,F,H,D	Oscilloscope, AN/USM 488 or Oscilloscope, OS262 (P)/U w/Amplifier, Dual Trace, AM 6785/U w/Time Base, Dual Trace, TD1159/U	6525-01-187-7847 6625-01-007-9416 6625-00-361-5318 6625-00-261-5139
07	O,F,H,D	Oscilloscope, OS291/G Test Set, Circuit Component, TS 4138/P	6625-01-258-0022 6625-01-255-0839
08	O,F,H,D	Tester, Semiconductor, TS 1836 D/U	6625-00-138-7320
09	O,F,H,D	Generator, Signal, SG1171A/U	6625-01-216-9684
10	O,F,H,D	Counter, Electronic, Digital, AN/USM 459	6625-01-271-3012

**Section IV. REMARKS
FOR
WARMING CABINET**

(1) REFERENCE CODE	(2) REMARKS
A	Tools and test equipment are listed for each assembly group.
B	Perform an annual electrical safety inspection and test. Perform the inspection and test after repair or replacement of electrical/electronic components.
C	Perform a semiannual calibration.

APPENDIX C

COMPONENTS OF END ITEM AND BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

C-1. Scope.

This appendix lists components of end item and basic issue items for the equipment to help you inventory items required for safe and efficient operation.

C-2. General.

The Components of End Item and Basic Issue Items lists are divided into the following sections.

- a. *Section II. Components of End Item.* These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts.
- b. *Section III. Basic Issue Items.* These are the minimum essential items required to place the equipment in operation, to operate it, and to perform emergency repairs. Basic issue items must be with the equipment during operation and whenever it is transferred between property accounts. This manual is your authority to request or requisition basic issue items, based on MTOE authorization of the end item.

C-3. Explanation of columns.

The following provides an explanation of columns found in both listings:

- a. *Item Number, Column 1.* This column indicates the item number assigned to the item.
- b. *National Stock Number, Column 2.* This column indicates the national stock number assigned to the item.
- c. *Description, Column 3.* This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the commercial and government entity (CAGE) code in parentheses followed by the part number.
- d. *Unit of Measure, Column 4.* This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation. These abbreviations are listed in the glossary.
- e. *Quantity, Column 5.* This column indicates the quantity (QTY) of the item(s) provided with the equipment.

**Section II. COMPONENTS OF END ITEM
FOR
WARMING CABINET**

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
1		Shelf, Adjustable (32510) 69193	EA	2

**Section III. BASIC ISSUE ITEMS
FOR
WARMING CABINET**

(1) ITEM NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
1		Installation Instructions (32510) 350263	EA	1
2		Operators Manual (32510) 350264	EA	1
3		Service Manual (32510) 350265	EA	1
4		Parts Catalog (32510)350270	EA	1

EXPENDABLE AND DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

D-1. Scope.

This appendix lists expendable and durable supplies and materials that are required to maintain the equipment. This listing is authorization to requisition and retain the items if not otherwise authorized.

D-2. Explanation of columns.

- a. *Item Number, Column 1.* The item number (Item No.) is sequentially assigned.
- b. *Level, Column 2.* This column identifies the lowest level of maintenance that requires the listed item. An explanation of the alphabetical character is provided in appendix B, section I of this manual.
- c. *National Stock Number, Column 3.* This column indicates the national stock number assigned to the item.
- d. *Description, Column 4.* This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.
- e. *Unit of Measure, Column 5.* This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by an alphabetical abbreviation. These abbreviations are listed in the glossary.
- f. *Quantity, Column 6.* This column indicates the quantity (QTY) of the item(s) provided with the equipment.

**Section II. EXPENDABLE AND DURABLE SUPPLIES AND MATERIALS
LIST FOR
WARMING CABINET**

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) UNIT OF MEASURE	(6) QTY
1	O	7920-01-004-7847	Cloth, Cleaning (97327) Rymple Cloth 301	RO	1
2	O	4940-01-087-3458	Workstation, ESD Control (12038) 4560901 or 4940-01-250-4236	EA	1
		5920-01-253-5368	Workstation, ESD Control (81349) MIL-W-87893-30 or	EA	1
3	O	7930-00-926-5171	Polish, Stainless Steel (81348) P-C-1121	PT	1
4	O	6810-00-753-4993	Isopropyl Alcohol (81348) TTI735	PT	1
5	O	7920-00-985-6849	Cloth, Polishing, 13½ in by 11 in Sheet (81348) DDD-C-450	EA	2
6	O	5970-00-152-3887	Insulating Compound (Heat sink) (13103) 249	TU	1

APPENDIX E

REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

E-1. Scope.

This manual lists spare and repair parts, special tools, special test equipment; and other special support equipment required for the performance of unit level, direct support, general support, and depot level maintenance. It authorizes the requisitioning and issue of spare and repair parts in consonance with the MAC (app B).

E-2. General.

The Repair Parts and Special Tools List is divided into the following sections:

- a. *Repair Parts, Section II.* A list of repair parts authorized for the performance of maintenance in figure number and item number sequence.
- b. *Special Tools, Test, and Support Equipment, Section III.* A list of special tools, test, and support equipment authorized for the performance of maintenance.

E-3. Explanation of columns in section II.

a. *Illustration, Column 1.*

(1) *Figure Number.* This column indicates the figure number (FIG NO.) of the illustration on which the item is shown.

(2) *Item Number.* This column indicates the item number (ITEM NO.) used to identify each item on the illustration.

b. *National Stock Number, Column 2.* This column indicates the national stock number assigned to the item.

c. *Description, Column 3.* This column indicates the federal item name of the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

d. *Unit of Measure, Column 4.* This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation.

e. *Quantity, Column 5.* This column indicates the quantity (QTY) of the item(s) to be used with or on the illustrated component, assembly, module, or end item.

E-4. Explanation of columns in section III.

a. *Item Number, Column 1.* This number is sequentially assigned.

b. *Level, Column 2.* This column identifies the lowest level of maintenance that requires the listed item. An explanation of the alphabetical character is provided in appendix B, section I of this manual.

c. *National Stock Number, Column 3.* This column indicates the national stock number assigned to the item.

d. *Description, Column 4.* This column indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the CAGE code in parentheses followed by the part number.

e. *Unit of Measure, Column 5.* This column indicates the unit of measure used in performing the actual operational or maintenance function. This measure is expressed by a two-character alphabetical abbreviation.

f. *Quantity, Column 6.* This column indicates the quantity (QTY) of the item(s) to be used with or on the equipment.

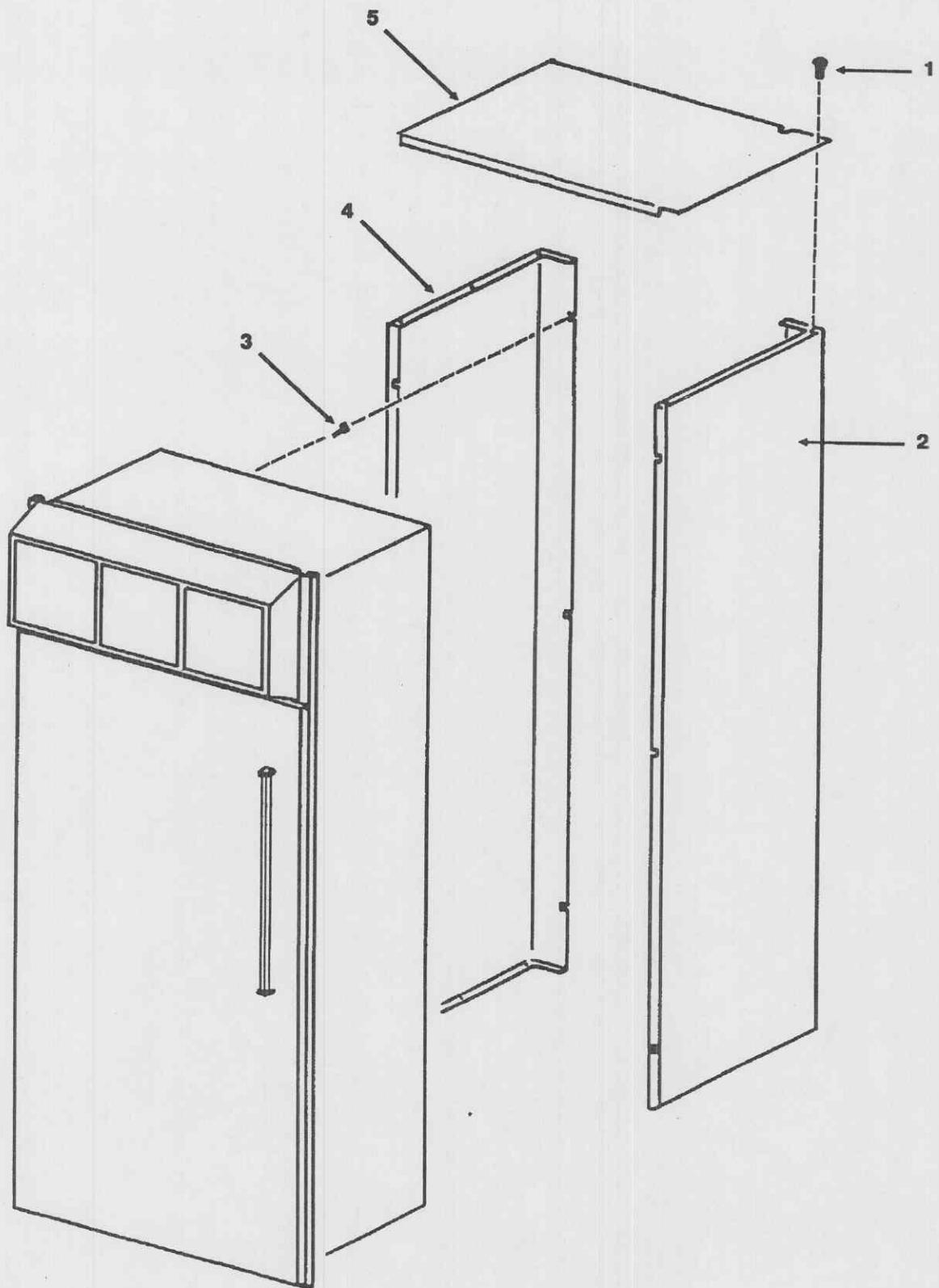


Figure E-1. Warming cabinet exterior.

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-1	1		Screw, 10-24 by 3/8 in, Self-tapping, Pan Head (32510) E6896	EA	6
E-1	2		Panel, Right Side (32510) 69020	EA	1
E-1	3		Screw, 10-24 by 3/8 in, Hex Socket Head (32510) E5293	EA	6
E-1	4		Panel, Left Side (32510) 60530	EA	1
E-1	5		Cover, Top (32510) 69182	EA	1

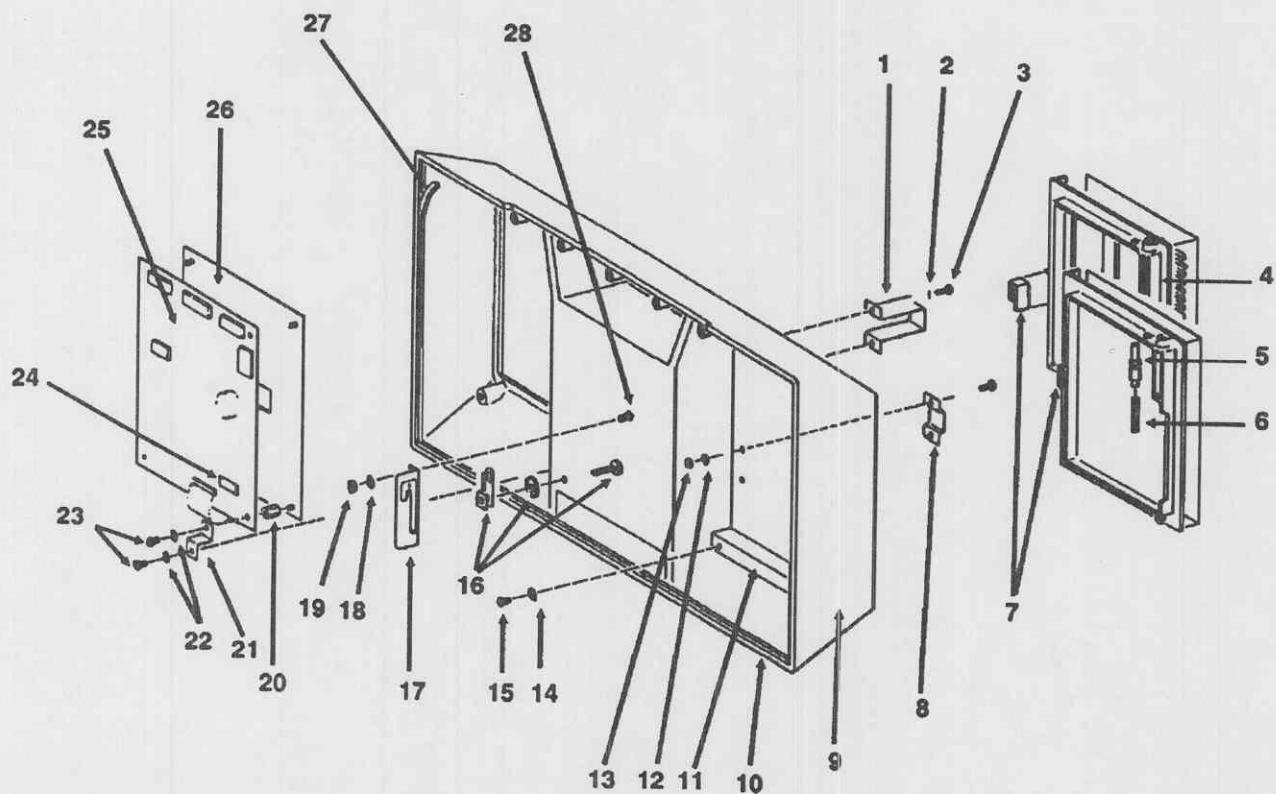


Figure E-2. Control housing.

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-2	1		Bracket, Storage Compartment Door Catch (32510) 86533	EA	1
E-2	2		Washer, No. 4, Internal Tooth Lock (32510) E2053	EA	2
E-2	3		Screw, 4-40 by 1/2 in, Phillips Pan Head (32510) E0013	EA	2
E-2	4		Door, Control Housing (32510) 86600	EA	2
E-2	5		Pin, Door Hinge (32510) 86534	EA	2
E-2	6		Spring, Compression (32510) 86535	EA	2
E-2	7		Catch, Magnetic Door (32510) 86531	EA	2
E-2	8		Bracket, Door Catch (32510) 86529	EA	2
E-2	9		Housing, Control Head (Control Housing) (32510) 86717	EA	1
E-2	10		Gasket, Control Housing, Bottom/Top (32510) 86654	EA	2
E-2	11		Panel, Closure (32510) 69238	EA	1
E-2	12		Washer, No. 4, Internal Tooth Lock (32510) E2053	EA	2
E-2	13		Nut, 4-40, Hex (32510) E7028	EA	2
E-2	14		Washer, No. 8, Internal Tooth Lock (32510) E6389	EA	2
E-2	15		Screw, 8-32 by 1/4 in, Phillips Pan Head (32510) E0069	EA	2
E-2	16		Latch (32510) 86440	EA	1
E-2	17		Bracket, Control Housing Latch (32510) 86513	EA	1

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-2	18		Washer, No. 8, Internal Tooth Lock (32510) E6389	EA	1
E-2	19		Nut, 8-32, Hex (32510) E6391	EA	1
E-2	20		Standoff (Spacer), 8-32 Internal Thread by 1/2 in (32510) 86532	EA	4
E-2	21		Bracket, Control Housing PCB (32510) 86445	EA	4
E-2	22		Washer, No. 8, Internal Tooth Lock (32510) E6389	EA	4
E-2	23		Screw, 8-32 by 1/4 in, Phillips Pan Head (32510) E0069	EA	4
E-2	24		EPROM (32510) Not Available	EA	1
E-2	25		Control Housing PCB (32510) 513855	EA	1
E-2	26		Control Panel (32510) 518413	EA	1
E-2	27		Gasket, Control Housing, Side (32510) 86655	EA	2
E-2	28		Screw, 8-32 by 1/2 in, Phillips Flat Head (32510) E2229	EA	1

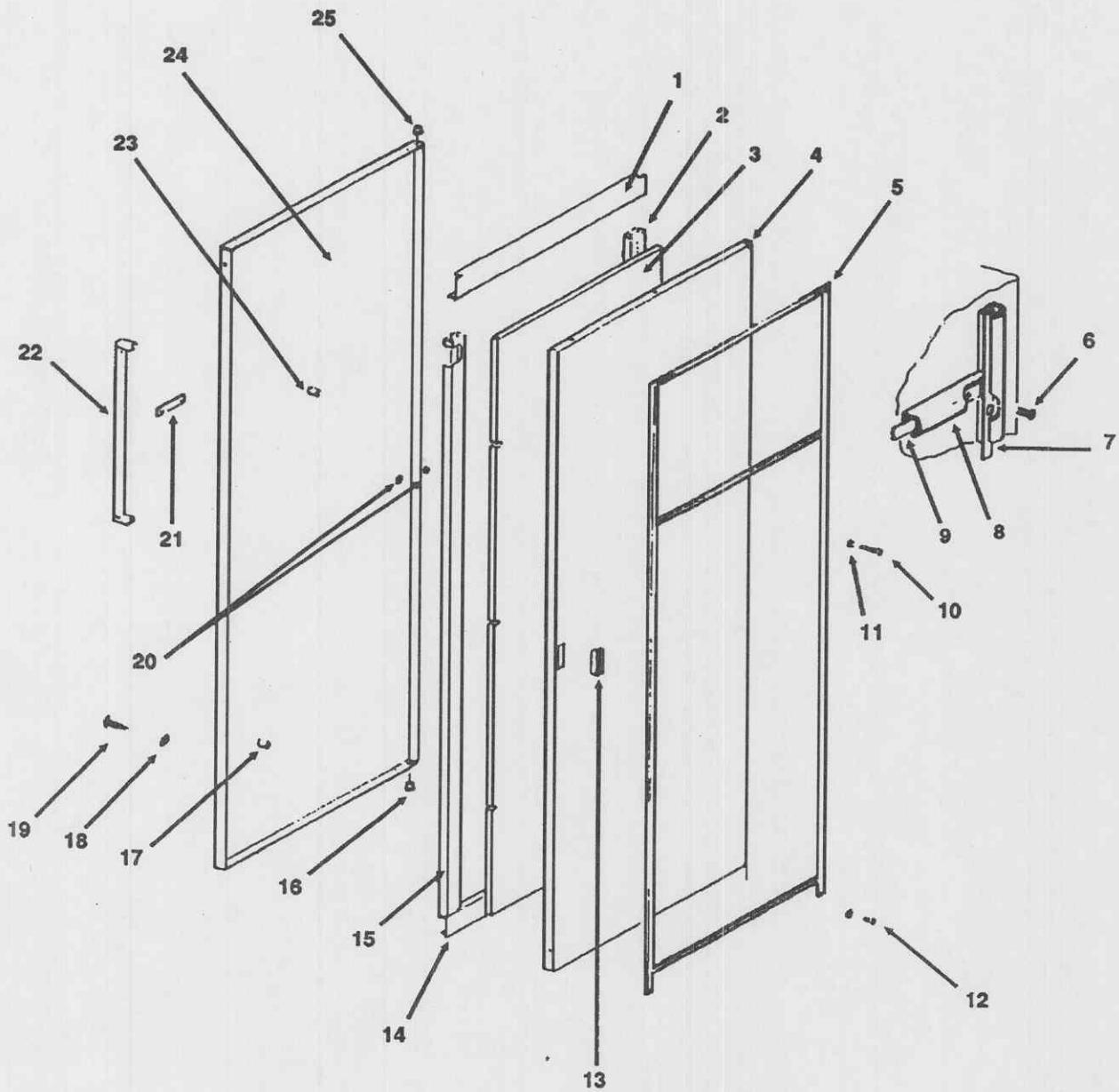


Figure E-3. Door assembly.

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-3	1		Brace, Door Support, Top (32510) 69861	EA	1
E-3	2		Brace, Door Support, Side (32510) 69862	EA	1
E-3	3		Insulation, Door (32510) 69868	EA	1
E-3	4		Panel, Inside, Door (32510) 69451	EA	1
E-3	5		Gasket, Door (32510) 69037	EA	1
E-3	6		Screw, 8-32 by 3/8 in, Self-tapping, Phillips Binding Head (32510) E2195	EA	40
E-3	7		Strip, Gasket Mounting, 57 5/8 in (32510) 69864	EA	2
E-3	8		Gasket, Shelf (32510) 69216	EA	1
E-3	9		Strip, Shelf Gasket Mounting, 27 1/4 in (32510) 69863	EA	1
E-3	10		Screw, 10-24 by 1 1/2 in, Flat Head (32510) E7069	EA	2
E-3	11		Washer, No. 10 (32510) 59977	EA	2
E-3	12		Screw, 10-32 by 1/2 in, Phillips Flat Head (32510) E4636	EA	45
E-3	13		Catch, Magnetic (32510) 60624	EA	1
E-3	14		Brace, Door Support, Bottom (32510) 69861	EA	1
E-3	15		Brace, Door Support, Side (32510) 69862	EA	1
E-3	16		Bushing, Door Hinge (32510) 69042	EA	1
E-3	17		Standoff (Spacer), 10-32 Internal Thread, 7/8 in Long (32510) 69870	EA	2

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-3	18		Washer, No. 10 (32510) 59977	EA	2
E-3	19		Screw, 10-32 by 1/2 in, Phillips Flat Head (32510) E4636	EA	1
E-3	20		Nut, Tinnerman, 1/8 in Shaft (32510) E4628	EA	2
E-3	21		Bezel, Nameplate (32510) 86547	EA	1
E-3	22		Handle, Door, 18 in (32510) 69865	EA	1
E-3	23		Standoff (Spacer), 13/64 in id by 5/16 in od by 7/8 in (32510) 69869	EA	2
E-3	24		Panel, Outside, Door (32510) 69452	EA	1
E-3	25		Bushing, Door Hinge (32510) 69042	EA	1

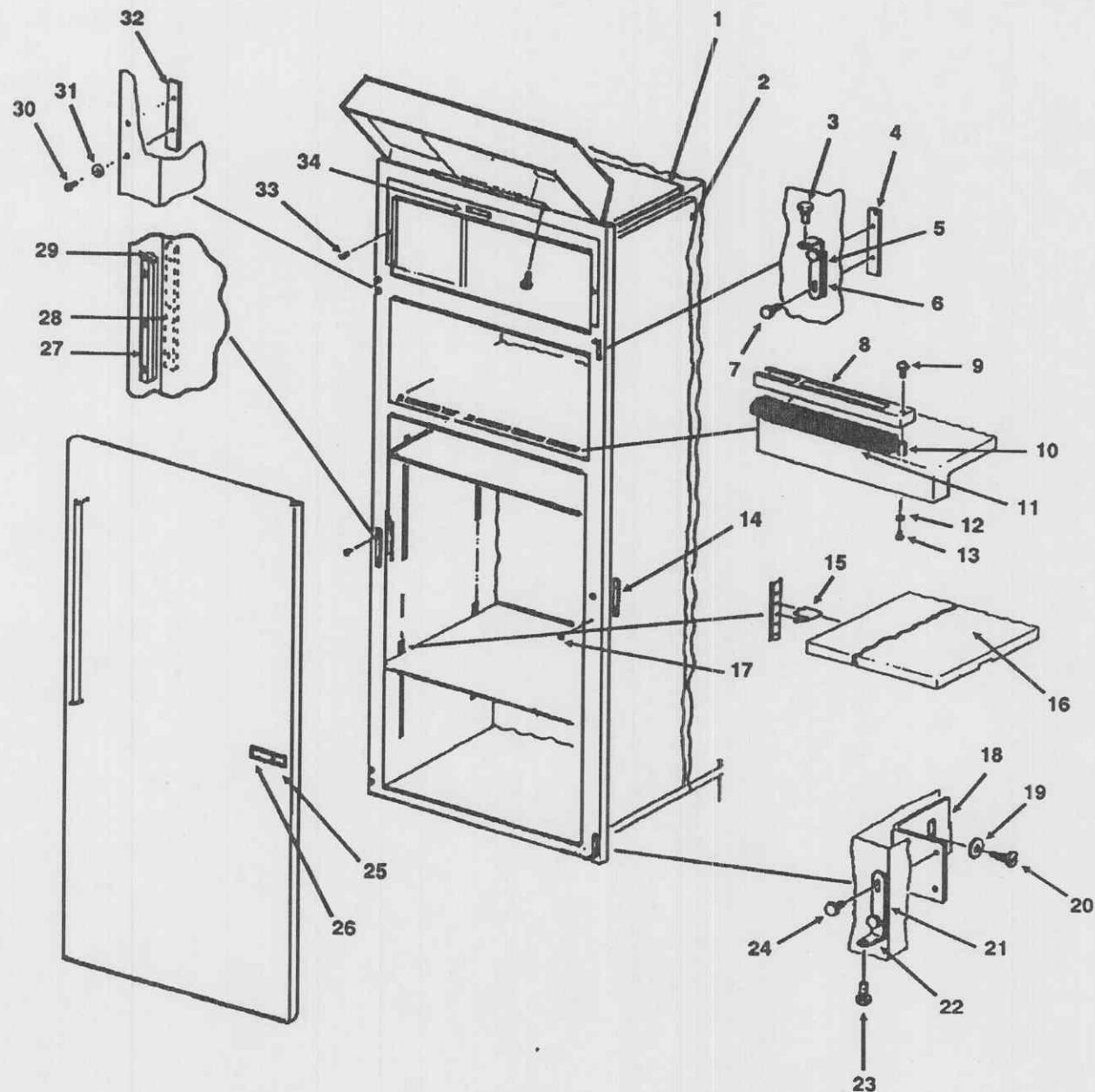


Figure E-4. Warming cabinet (front).

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-4	1		Insulation, Top (32510) 69242	EA	1
E-4	2		Insulation, Side (32510) 69243	EA	2
E-4	3		Pin, Door Hinge (32510) 69047	EA	1
E-4	4		Plate, Hinge Mounting Bracket (32510) 69133	EA	2
E-4	5		Bracket, Hinge (32510) 69044	EA	1
E-4	6		Shim, Door Hinge, 1/16 in Thick (32510) 69445 and/or Shim, Door Hinge 7/64 in Thick (32510) 60596 and/or Shim, Door Hinge, 23/64 in Thick (32510) 60672	EA	1
E-4	7		Screw, 10-32 by 3/4 in, Hex Head (32510) E4699	EA	2
E-4	8		Cover, Shelf Air Filter (32510) 69165	EA	1
E-4	9		Thumbscrew, 8-32 by 5/8 in (32510) 69164	EA	1
E-4	10		Standoff (Spacer), 8-32 Internal Thread by 1/2 in Long (32510) 86532	EA	2
E-4	11		Filter, Shelf (32510) 69195	EA	1
E-4	12		Washer, No. 8, Internal Tooth Lock (32510) E6389	EA	2
E-4	13		Screw, 8-32 by 3/16 in, Phillips Pan Head (32510) E5019	EA	2
E-4	14		Plate, Strike Mounting (32510) 69867	EA	1

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-4	15		Bracket, Shelf Pilaster Clip (32510) 69167	EA	12
E-4	16		Shelf, Adjustable (32510) 69193	EA	3
E-4	17		Screw, 6-32 by 3/8 in, Phillips Truss Head (32510) E0074	EA	2
E-4	18		Bracket, Hinge Support (32510) 69450	EA	1
E-4	19		Washer, No. 10, Flat (32510) E6563	EA	2
E-4	20		Screw, 10-32 by 1/2 in, Self-tapping, Pan Head (32510) E7021	EA	2
E-4	21		Shim, Door Hinge, 1/16 in Thick (32510) 69445 and/or Shim, Door Hinge 7/64 in Thick (32510) 60596 and/or Shim, Door Hinge, 23/64 in Thick (32510) 60672	EA	1
E-4	22		Bracket, Hinge (32510) 69044	EA	1
E-4	23		Pin, Door Hinge (32510) 69047	EA	1
E-4	24		Screw, 10-32 by 3/4 in, Flat Head (32510) E4699	EA	2
E-4	25		Decal, "SYBRON" (32510) 86549	EA	1
E-4	26		Decal, "CASTLE WARMING CABINET" (32510) 69084	EA	1
E-4	27		Plate, Magnetic Catch Strike (32510) 69866	EA	1
E-4	28		Plate, Strike Mounting (32510) 69867	EA	1

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-4	29		Shim, Door Strike Plate, 7/64 in Thick (32510) 60640 and/or Shim, Door Strike Plate, 1/16 in Thick (32510) 60641 and/or Shim, Door Strike Plate, 23/64 in Thick (32510) 60671	EA	1
E-4	30		Screw, 10-32 by 1/2 in, Phillips Flat Head (32510) E4636	EA	2
E-4	31		Washer, No. 10 (32510) 59977	EA	2
E-4	32		Plate, Hinge Mounting Bracket (32510) 69133	EA	1
E-4	33		Screw, 6-32 by 3/8 in, Self-tapping, Phillips Pan Head (32510) E2169	EA	2
E-4	34		Decal, Identification (32510) 69077	EA	1

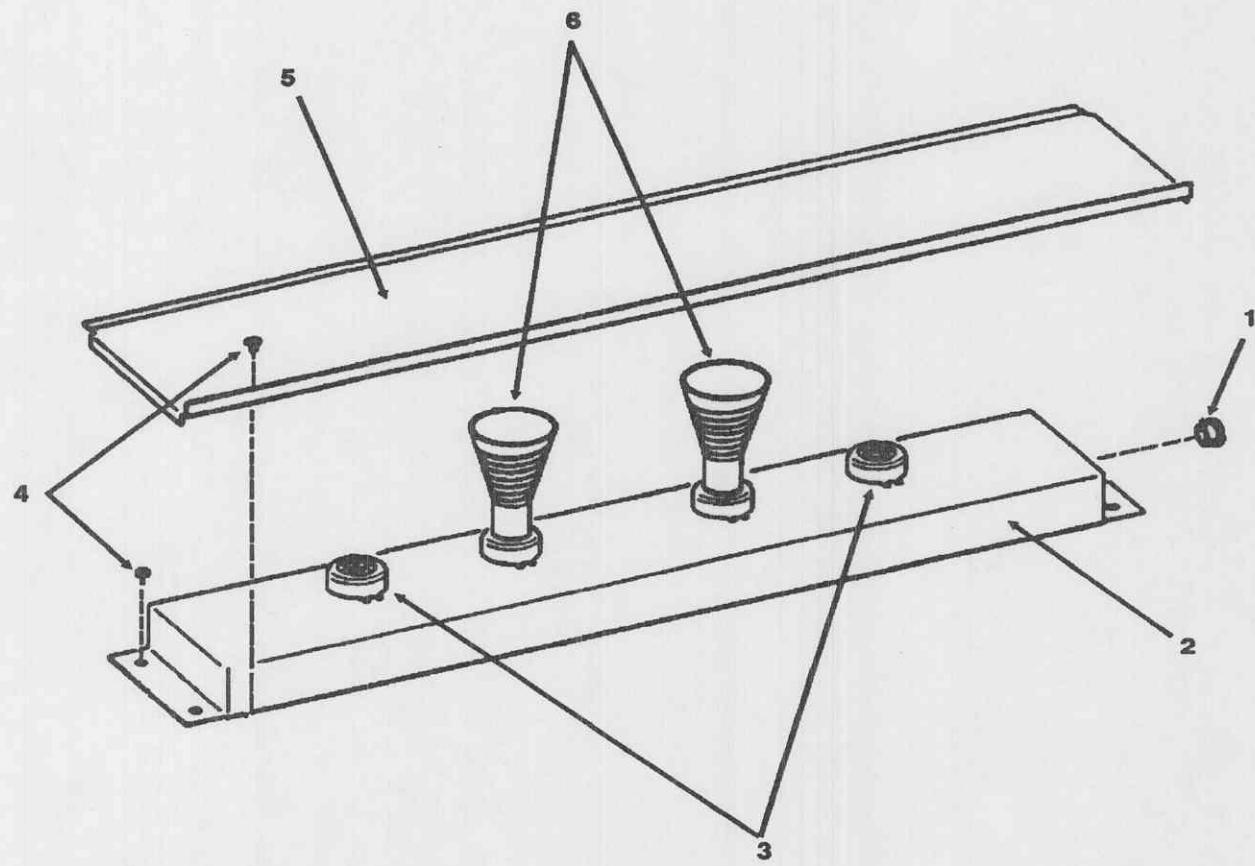


Figure E-5. Heater assembly.

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-5	1		Bushing, Snap (32510) 40730	EA	1
E-5	2		Panel, Heater Mounting (32510) 69068	EA	1
E-5	3		Receptacle, Heater (32510) 61051	EA	4
E-5	4		Screw, 6-32 by 1/4 in, Self-tapping, Phillips Pan Head (32510) E2194	EA	7
E-5	5		Cover, Heater (32510) 69070	EA	1
E-5	6		Heater, 120 V, 500 W (32510) 69093 or Heater, 240 V, 500 W (32510) 69407	EA	2

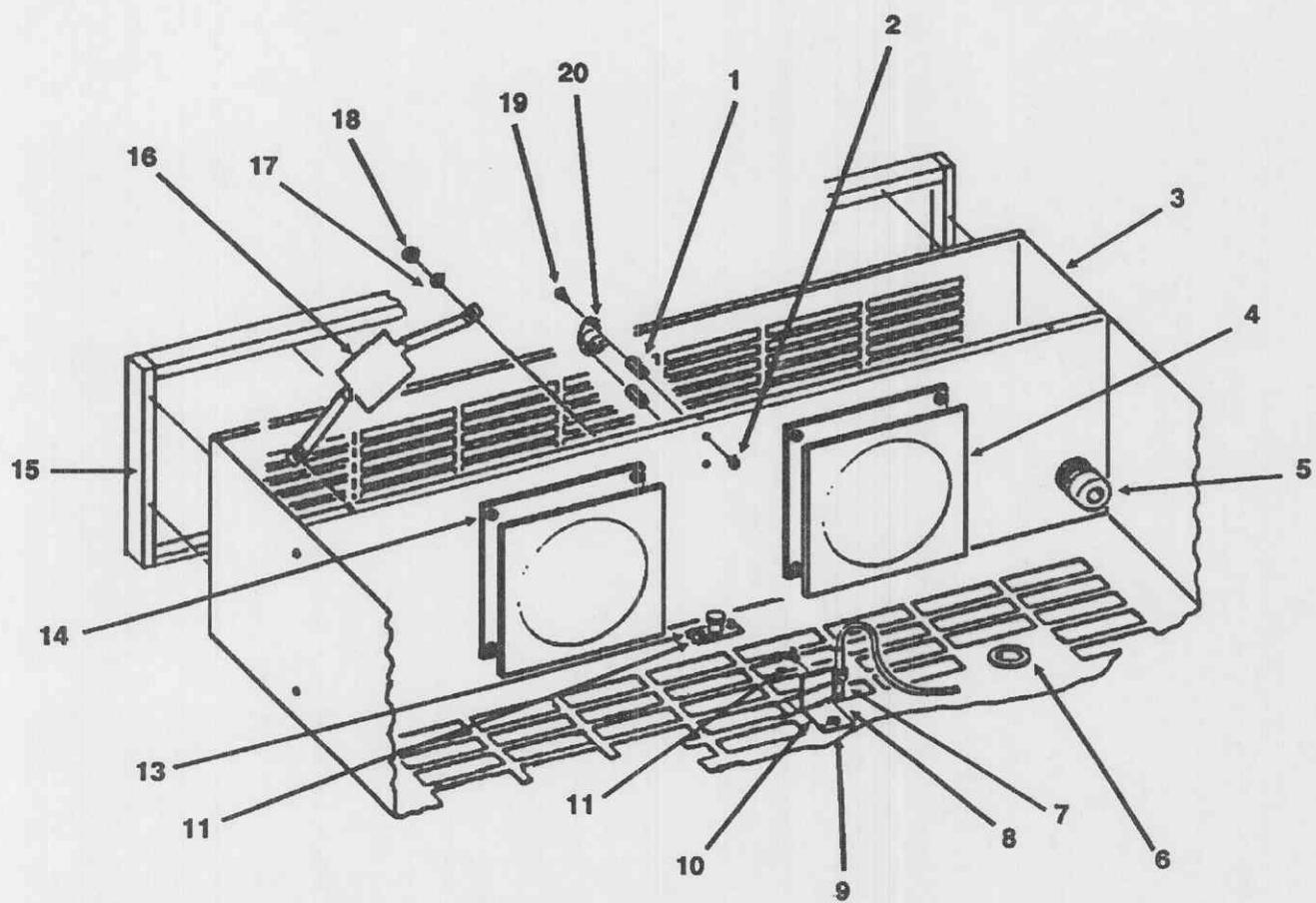


Figure E-6. Fan and heater assemblies.

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-6	1		Standoff (Spacer), 3/16 in id by 7/16 in od by 1/16 in Thick (32510) 86757	EA	1
E-6	2		Screw, 4-40 by 5/16 in, Phillips Pan Head (32510) E6610	EA	1
E-6	3		Cabinet Control Chassis (Box, Control) (32510) 69076	EA	1
E-6	4		Fan, 240 V, 50/60 Hz, 127 ft ³ /min (32510) 69095 or Fan, 120 V, 50/60 Hz, 127 ft ³ /min (32510) 69094	EA	2
E-6	5		Connector, 13/16 in dia (32510) 69003	EA	1
E-6	6		Bushing, Snap (32510) 69091	EA	1
E-6	7		Sensor (Probe), Temperature (32510) 518407	EA	1
E-6	8		Clamp, 1/4 in dia Cable (32510) 67687	EA	1
E-6	9		Screw, 6-32 by 1/4 in, Self-tapping, Pan Head (32510) E6835	EA	1
E-6	10		Bracket, Temperature Sensor Mounting (32510) 69455	EA	1
E-6	11		Screw, 6-32 by 1/4 in, Self-tapping, Pan Head (32510) E2194	EA	1
E-6	12		Stop, Cabinet Control Chassis (32510) 69173	EA	1
E-6	13		Rivet, 1/8 in dia by 3/8 in Long, Domed Top (32510) E7048	EA	2
E-6	14		Screw, 8-32 by 1/2 in, Phillips Pan Head (32510) E6835	EA	8

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-6	15		Strip, Foam Rubber, 3/8 in by 1/2 in (32510) R3423	FT	AR
E-6	16		Shield, Fan Heat (32510) 56181	EA	2
E-6	17		Washer, No. 8, Internal Tooth Lock (32510) E2041	EA	1
E-6	18		Nut, 8-32, Hex (32510) E0253	EA	1
E-6	19		Screw, 4-40 by 5/16 in, Phillips Pan Head (32510) E6610	EA	1
E-6	20		Thermostat, 212°F (100°C) (32510) 69107	EA	1

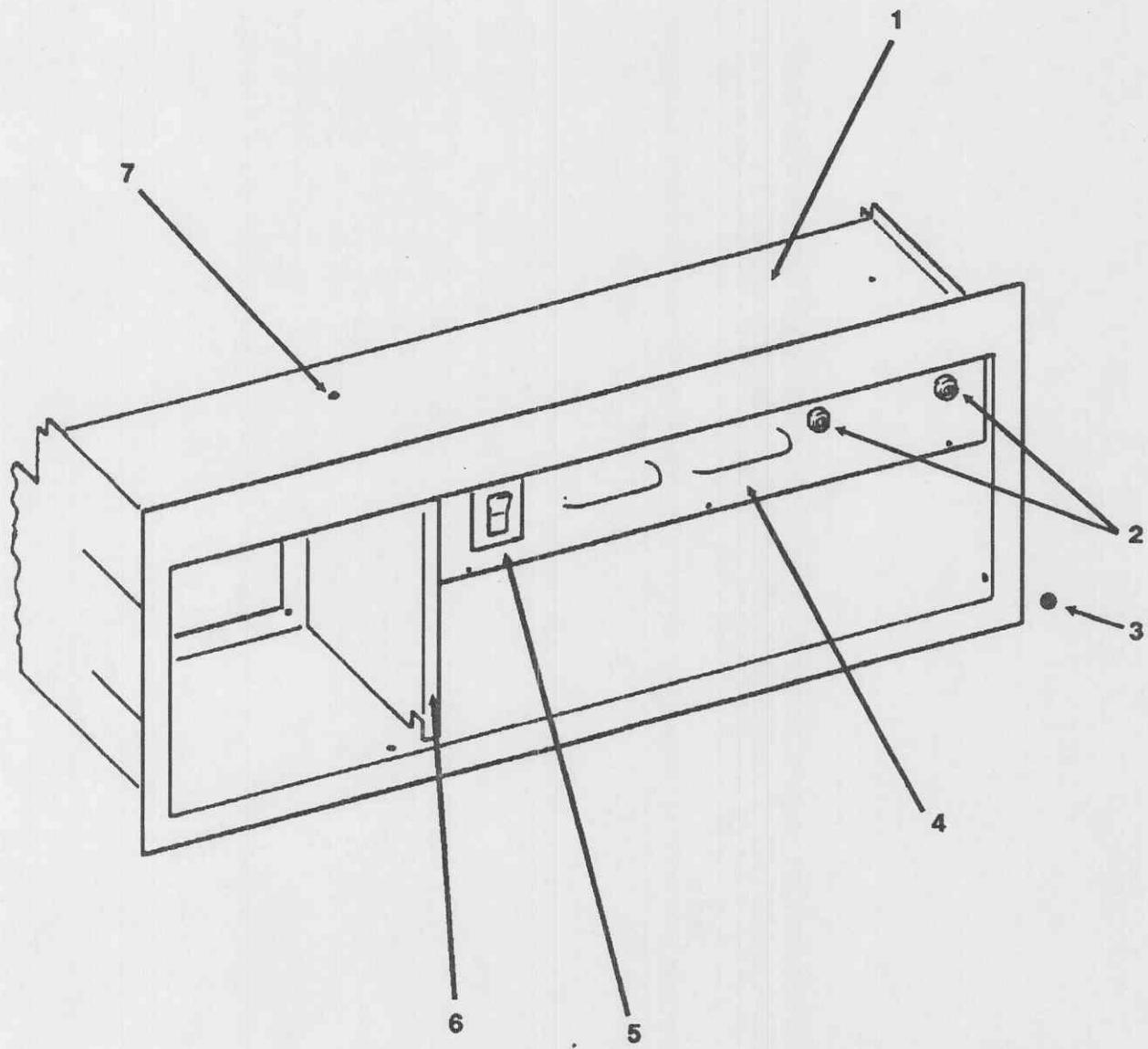


Figure E-7. Cabinet control chassis (front).

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-7	1		Cabinet Control Chassis (Box, Control) (32510) 69076	EA	1
E-7	2		Strain Relief, 21/64 in by 23/64 in dia (32510) 57030	EA	2
E-7	3		Nut, 6-32, Hex (32510) E7044	EA	2
E-7	4		Panel, Control Module (32510) 69073	EA	1
E-7	5		Circuit Breaker, 10 A (32510) 69110	EA	1
E-7	6		Panel, Divider (32510) 69071	EA	1
E-7	7		Rivet(s), 1/8 in dia by 3/8 in Long, Domed Top (32510) E7048	EA	AR

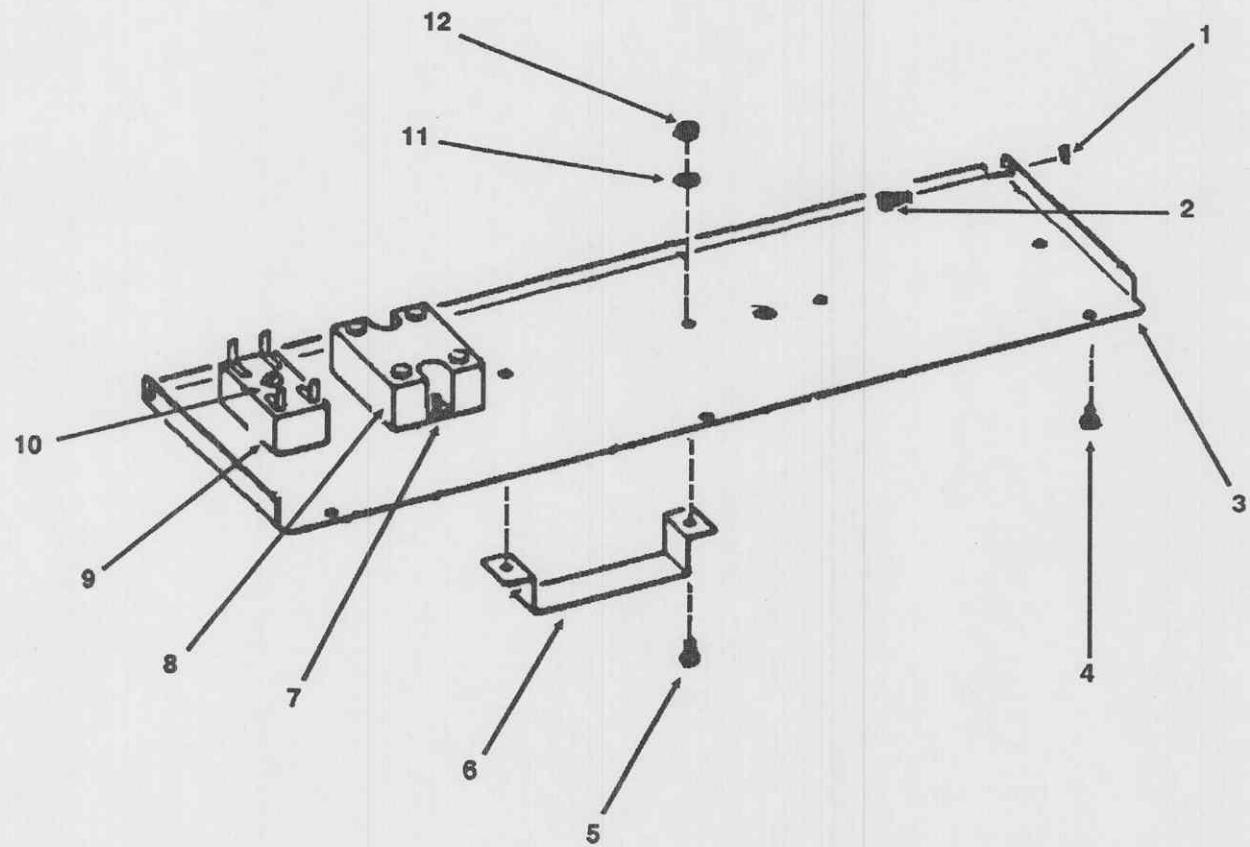


Figure E-8. Control module door (open).

**Section II. REPAIR PARTS LIST
FOR
WARMING CABINET**

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-8	1		Washer, 3/16 in id by 7/16 in od by 1/16 in Thick (32510) 69102	EA	2
E-8	2		Screw, 8-32 (32510) 69100	EA	2
E-8	3		Door, Control Module (32510) 69072	EA	1
E-8	4		Screw, 6-32 by 1/4 in, Self-tapping, Pan Head (32510) E2194	EA	3
E-8	5		Screw, 6-32 by 1/4 in, Phillips Pan Head (32510) E5010	EA	2
E-8	6		Bracket, Control Module (32510) 86947	EA	1
E-8	7		Screw, 8-32 by 1/2 in, Phillips Pan Head (32510) E6835 and Nut, 8-32, Hex (32510) E0253	EA	2
E-8	8		Relay, 40 A (32510) 69088	EA	1
E-8	9		Relay, 2-1/2 A (32510) 69089	EA	1
E-8	10		Screw, 6-32 by 1-1/4 in, Phillips Pan Head (32510) E4809 and Nut, 6-32, Hex (32510) E7139	EA	1
E-8	11		Washer, No. 6, Internal Tooth Lock (32510) E2043	EA	2
E-8	12		Nut, 6-32, Hex (32510) E7139	EA	2

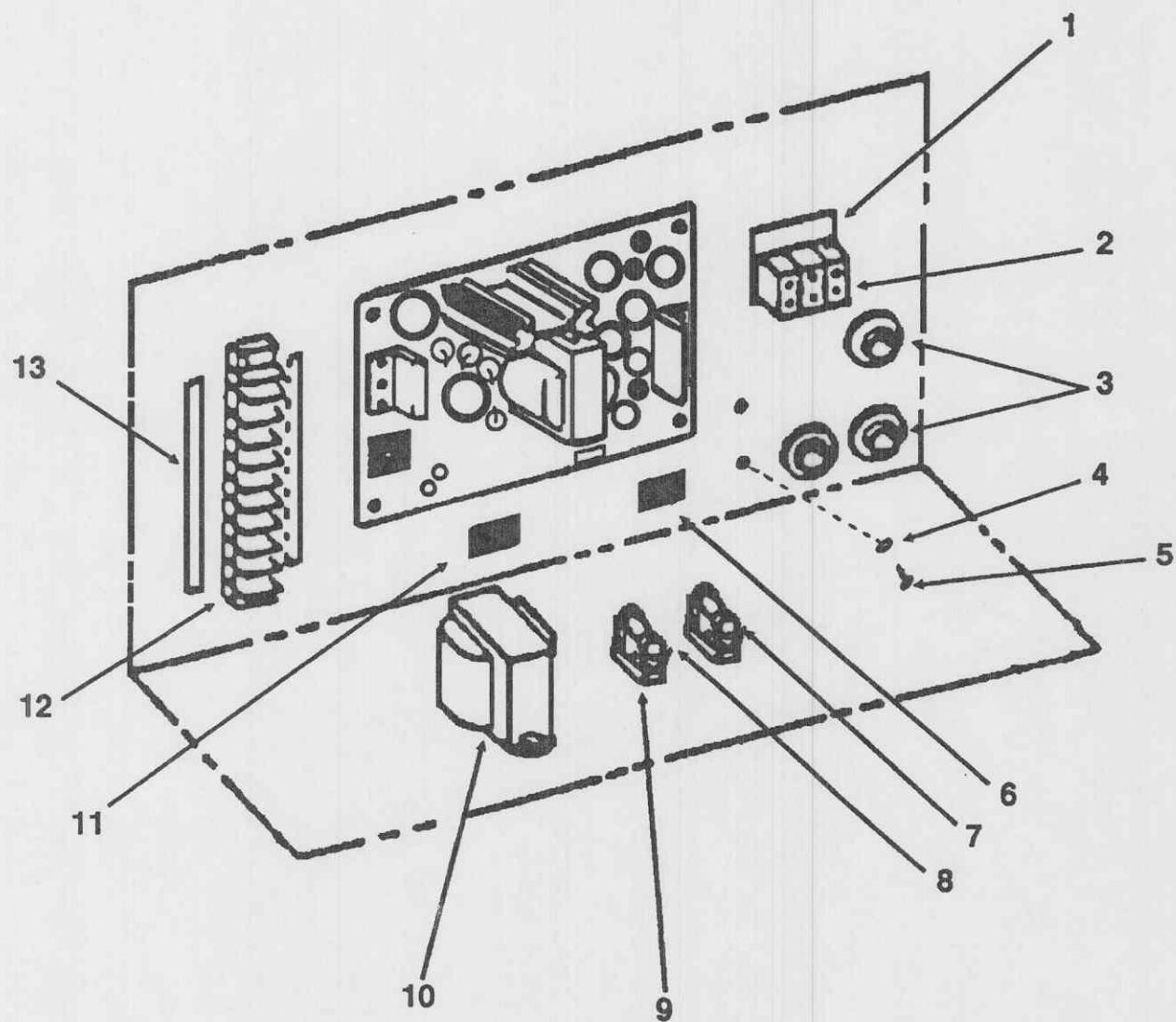


Figure E-9. Control module (inside).

Section II. REPAIR PARTS LIST
FOR
WARMING CABINET

(1) ILLUSTRATION		(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION	(4) UNIT OF MEASURE	(5) QTY
FIG NO.	ITEM NO.				
E-9	1		Insulator, Electrical (32510) 69410	EA	1
E-9	2		Strip, Terminal, 3-connector (32510) 86591	EA	1
E-9	3		Connector, 13/16 in dia (32510) 69003	EA	3
E-9	4		Washer, No. 10, Terminal Cup (32510) 61419	EA	2
E-9	5		Screw, 10-32 by 3/16 in, Hex Head, Ground (32510) E6645	EA	2
E-9	6		Receptacle, 2-connector (32510) 69092	EA	1
E-9	7		Fuse, 3 A, 120 V (32510) 72441	EA	1
E-9	8		Block, Fuse Mounting (32510) 58579	EA	2
E-9	9		Fuse, 1/4 A, 120 V (32510) 69425 or Fuse, 1/8 A, 240 V (32510) 69424	EA	1
E-9	10		Transformer, 115 V - 230 V/24 V (32510) 69090	EA	1
E-9	11		Receptacle, 3-connector (32510) 44831	EA	1
E-9	12		Block, Terminal, 10-connector (32510) 49893	EA	1
E-9	13		Strip, Terminal Block Marking (32510) 51255	EA	1

**Section III. SPECIAL TOOLS, TEST, AND SUPPORT EQUIPMENT
FOR
WARMING CABINET**

(1) ITEM NO.	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) UNIT OF MEASURE	(6) QTY
			None applicable for this unit.		

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GLOSSARY

A	Ampere.
AFR	Air Force regulation.
AMPS	Amperes.
AR	Army regulation.
AR	As required. (Used in the quantity column in Appendix E.)
Blocking	Any strong material such as blocks of wood or a wooden box to support the weight of the door while maintenance services are being performed.
C	Operator or crew.
CAGE	Commercial and government entity.
chap	Chapter.
Compartment	The areas inside the warming cabinet divided by the shelves or the areas of the cabinet control chassis separated by metal dividers.
cm	Centimeter.
cu	Cubic.
D	Depot level maintenance.
DA	Department of the Army.
DC	Direct current.
°C	Degrees Celsius.
°F	Degrees Fahrenheit.
dia	Diameter.
DLAM	Defense Logistics Agency manual.
DPSC	Defense Personnel Support Center.
DS	Direct support.
EA	Each.
EPROM	Erasable programmable read-only memory.
ESD	Electrostatic discharge.
F	Direct support maintenance.
fig	Figure.
FM	Field manual.
FSC	Federal supply class.
FSCM	Federal supply code for manufacturers. This is an obsolete term. CAGE (commercial and government entity) is the correct acronym.
ft	Foot (feet).
ft ³ /min	Cubic feet per minute (formerly CFM).
GS	General support.
H	General support maintenance.

Hz	Hertz.
id	Inner diameter.
in	Inch.
ISO	International Standards Organization.
J	Jack.
Jack	Any male connector used in conjunction with electronic circuits.
kg	Kilogram.
lbs	Pounds.
LED	Light emitting diode.
m	Meter.
MAC	Maintenance allocation chart.
MEDSOM	Medical supply, optical, and maintenance (battalion).
mm	Millimeter.
MPL	Mandatory parts list.
MTOE	Modified table of organization and equipment.
NO. (No.)	Number.
O	Unit maintenance.
od	Outer diameter.
0-volt	Refers to the neutral wire that has zero voltage in relation to electrical earth ground.
para	Paragraph.
PC	Printed circuit.
PCB	Printed circuit board.
Ø	Phase is the difference in time between any point in an electrical cycle and the beginning of that cycle. The beginning of a cycle is the point at which the cycle passes through zero voltage moving in a positive direction.
PMCS	Preventive maintenance checks and services.
PT	Pint.
QA	Quality assurance.
QC	Quality control.
QTY	Quantity.
RO	Roll.
RPL	Repair parts list.
SB	Supply bulletin.
sec	Section.
TB	Technical bulletin.
TDA	Table of distribution and allowances.
Test point	An electrical point on a PCB that is typically constructed to ease troubleshooting.

TM	Technical manual.
TU	Tube.
V	Volts.
VDC	Volts direct current.
W	Watts.

Index

This index is organized alphabetically by topic and by subtopic. Topics and subtopics are identified by paragraph number.

Abbreviations, explanation, 1-2

Administrative storage, 1-5

Air circulation, 1-11, 1-12, 1-15, 1-16, 2-11, 2-12

Alarm, 2-6, 3-11

Alphanumeric codes, 3-14

Assembling the unit, 3-7

Associated material, 2-8

Associated support items, 2-7

Basic issue items, 3-3, 4-3

Basic operation, 1-16

Block diagram, electrical 3-14

Blocking, 3-17

Buzzer, 2-6, 3-11

Cabinet control chassis, 1-13, 3-15, 3-18, 3-19, 3-20, 3-21, 3-22, 3-23, 3-24, 3-25, 3-26, 3-27

Cabinet door, 1-12, 2-2, 3-17

Cabinet door switch, 1-12, 3-17

Cabinet frame, 3-1

Calibration, 3-12, 3-15

Capabilities, 1-11

Capacity, storage, 1-13

Caution, 2-1, 2-6, 2-11, 3-17, 3-24, 3-25, 3-29

Characteristics, 1-11

Circuit breaker, 1-12, 2-6, 3-12, 3-25, 3-27, 3-28

Circulation, air, 1-11, 1-12, 1-15, 1-16, 2-11, 2-12

Cleaning, 2-9, 2-10, 2-11, 3-9, 3-17, 3-28

Common names, 1-8

Compartment

 Fan, 1-8, 1-16, 3-19, 3-20, 3-21, 3-22, 3-23

 Heater, 3-20, 3-21, 3-22

 Storage, 1-1, 1-8, 1-11, 1-12, 1-13

Complaints, medical materiel, 1-9

Components of end item, 3-3, 4-3

Control functions, 1-17

Control housing, 1-8, 1-12, 3-11, 3-15, 3-18, 3-19, 3-20, 3-21, 3-22, 3-23, 3-24, 3-25, 3-27, 3-28

Control module, 1-8, 1-12, 1-13, 3-15, 3-16, 3-18, 3-19, 3-20, 3-21, 3-22, 3-23, 3-24, 3-25

Control panel, 1-8, 1-12, 2-1, 2-2, 2-9, 3-7, 3-11, 3-17, 3-25

Decals, 1-13

Deficiencies, reporting, 3-10

Destruction of Army materiel, 1-4

Diagram, electrical block, 3-14

Differences, model, 1-14

Dimensions, 1-13

Door, cabinet, 1-12, 2-2, 2-5, 2-11, 3-11, 3-17

Door gasket, 2-10, 3-17

Door handle, 3-17

Door swing, 3-17

Door switch, 1-12, 3-12, 3-19, 3-20, 3-21, 3-22, 3-23

Durable supplies, 3-4, 4-4

Electrical block diagram, 3-14

Electrical power, 2-2, 3-7, 3-18

Electrical requirement, 1-13

Equipment

 Name, 1-1

 Purpose, 1-1

Erasable programmable read-only memory device, 3-25

Expendable supplies, 3-4, 4-4

Explanation of abbreviations and terms, 1-2

Fahrenheit scale, 3-26, 3-27

Fan, 1-8, 1-16, 3-9, 3-11, 3-12, 3-20

Fan compartment, 3-19, 3-20, 3-21, 3-22, 3-23

Features, 1-11

Filter, shelf, 1-12, 2-11, 3-9, 3-12

Flammable substances, 1-15, 2-12

Forms, 1-3

Functional testing, 3-11

Gasket, door, 2-10, 3-17

Green indicator, 2-2

Handle, door, 3-17

Heater, 3-11, 3-12, 3-21

Heater compartment, 3-20, 3-21, 3-22

Heat sink compound, 3-24

Hex-head screws, 3-17

Hinge pins, 3-17

Installing the unit, 3-7

Insulating compound, 3-24

International Standards Organization, 2-12, 3-7, 3-28, 3-29

Jack, 3-14, 3-25, 3-27

Jumper, 3-14, 3-26, 3-27

Junction box, 1-13, 3-29

Light emitting diode, 1-17, 2-1, 3-11

Loading the cabinet, 2-3

Lubrication, 3-8

Maintenance functions, 3-1

Malfunction, 2-6

Manufacturer data plate, 1-13

Medical materiel complaints, 1-9

Model differences, 1-14

Model number, 1-1

Mounting brackets, 3-17

Nameplate, 3-17

Nomenclature cross-reference, 1-8

Note, 1-13, 2-2, 2-6, 2-10, 2-11, 3-9, 3-11, 3-15, 3-21, 3-23, 3-25, 3-27

Official nomenclature, 1-8

Operation under unusual conditions, 2-12

Overheating, 2-1, 2-5, 2-6, 3-9, 3-13

Phillips-head screws, 3-17

Potentiometer, 3-15

Power supply, 3-12, 3-13, 3-15, 3-16, 3-19, 3-20, 3-21, 3-22, 3-23

Power switch, 1-12, 2-1, 2-2, 2-4, 2-6, 2-11, 3-7, 3-11, 3-12, 3-15, 3-17, 3-27

Preventive maintenance checks and services, 1-5, 3-9

Printed circuit board, 1-8, 1-17, 3-1, 3-11, 3-12, 3-13, 3-15, 3-18, 3-19, 3-20, 3-21, 3-22, 3-23, 3-25, 4-8

Purpose of equipment, 1-1

Quality assurance or quality control, 1-7

Quality improvement reports, 1-9

Records, 1-3

Relay, 3-24

Repair parts, 3-5, 4-5

Reports, 1-3

Resistor, 3-11, 3-15

Safety, 1-15

Scope, 1-1, 3-1

Screws

Hex-head, 3-17

Phillips-head, 3-17

Washer-head, 3-17

Sensor, temperature, 1-17, 3-12, 3-22, 3-23

Set temperature, 2-1, 2-2, 2-5, 3-11, 3-12, 3-13

Shelf filter, 1-12, 2-11, 3-9, 3-12

Shelves, 1-11, 1-12, 1-15, 2-2, 2-3, 2-9, 2-11, 3-7, 3-17

Shipment, 1-6, 3-29

Shut-down procedures, 2-4

Spacers, 3-19, 3-22, 3-25

Special tools, 3-6, 4-6

Specifications, 1-13

Start-up procedures, 2-2

Storage

Administrative, 1-5

Preparation, 1-6, 3-28

Storage capacity, 1-13

Storage compartment, 1-12, 2-2

Striker plate assembly, 3-17

Support maintenance services, 4-7

Swing, door, 3-17

Switch, cabinet door, 1-12, 3-12, 3-19, 3-20, 3-21, 3-22, 3-23

Switch, power, 1-12, 2-1, 2-2, 2-4, 2-6, 2-11, 3-7, 3-11, 3-12, 3-15, 3-17, 3-27

Tabulated data, 1-13

Temperature

Conversion, 1-13, 3-27

Display, 1-12, 1-17, 2-1, 2-2, 2-6, 3-13, 3-26, 3-27

Sensor, 1-17, 3-12, 3-23

Set, 2-1, 2-2, 2-5, 3-11, 3-12, 3-13

Terminal block, 3-14, 3-29

Terms, explanation, 1-2

Test equipment, 3-2, 4-2

Testing, functional, 3-11

Thermostat, 1-17, 3-12, 3-22

Tinnerman nuts, 3-17

Tools, 3-2, 4-2

Transformer, 3-18

Troubleshooting

Support level, 4-8

Unit level, 3-12

Type of manual, 1-1

Unit level maintenance, 3-1

Unpacking the unit, 3-7

Unusual conditions, 2-12

Vent, 3-7

Voltage conversions, 3-1, 4-9

Voltage tolerances, 1-13, 3-12

Voltmeter, 3-15

Volume, alarm, 3-11

Warning, 1-15, 2-2, 2-4, 2-9, 2-11, 2-12, 3-15

Warranty, 1-10

Washer-head screws, 3-17

Weight, 1-13, 2-3

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°C	°F	°C	°F	°C	°F	°C	°F
0	32.0	26	78.8	52	125.6	78	172.4
1	33.8	27	80.6	53	127.4	79	174.2
2	35.6	28	82.4	54	129.2	80	176.0
3	37.4	29	84.2	55	131.0	81	177.8
4	39.2	30	86.0	56	132.8	82	179.6
5	41.0	31	87.8	57	134.6	83	181.4
6	42.8	32	89.6	58	136.4	84	183.2
7	44.6	33	91.4	59	138.2	85	185.0
8	46.4	34	93.2	60	140.0	86	186.8
9	48.2	35	95.0	61	141.8	87	188.6
10	50.0	36	96.8	62	143.6	88	190.4
11	51.8	37	98.6	63	145.4	89	192.2
12	53.6	38	100.4	64	147.2	90	194.0
13	55.4	39	102.2	65	149.0	91	195.8
14	57.2	40	104.0	66	150.8	92	197.6
15	59.0	41	105.8	67	152.6	93	199.4
16	60.8	42	107.6	68	154.4	94	201.2
17	62.6	43	109.4	69	156.2	95	203.0
18	64.4	44	111.2	70	158.0	96	204.8
19	66.2	45	113.0	71	159.8	97	206.6
20	68.0	46	114.8	72	161.6	98	208.4
21	69.8	47	116.6	73	163.4	99	210.2
22	71.6	48	118.4	74	165.2	100	212.0
23	73.4	49	120.2	75	167.0		
24	75.2	50	122.0	76	168.8		
25	77.0	51	123.8	77	170.6		

Degrees Fahrenheit to Degrees Celsius: $(^{\circ}\text{F} - 32) \times \frac{5}{9} = ^{\circ}\text{C}$

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